BANGALORE ELECRICITY SUPPLY COMPANY LIMITED
Customer Relations Section: Ground Floor, 2nd- Block
Corporate office, K. R. Circle, Bengaluru -560 001

TENDER ENQUIRY NO:
BESCOM/2023-24/OW/WORK_INDENT149 dated 05.03.2024

INVITATION TO BID

For

Implementation of Smart Business Management System by providing Web Based Total Revenue Management (TRM) Modules, GIS, BI & Analytical tools and other modules along with supply of Hardware, Software, Man Power, Stationaries and Consumables on the basis of System as a Service (SaaS) and other allied services in Sub-Divisions and Accounting Sections of Non-RAPDRP areas in Chitradurga Area Zone (CTAZ) and Bangalore Rural Area Zone (BRAZ).

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SECTION 'A'– INSTRUCTION TO BIDDERS

1. **Introduction:** BESCOM is entrusted with the responsibility of distribution of electricity in 8-Districts of Karnataka. New Connection, Billing and Collection are the core business activities of the Company. BESCOM desires to avail the services of the Service Providers (SP) who can provide Smart Business Management System by providing Web based Total Revenue Management (TRM) modules, GIS, BI & Analytical tools and other modules along with supply of Hardware, Software, Man Power, Stationaries and Consumables on System as a Service (SaaS) basis and other allied services in Sub-Divisions and Accounting Sections of Non RAPDRP areas in Chitradurga Area Zone (CTAZ) and Bangalore Rural Area Zone (BRAZ).

2. General Manager (Customer Relations) on behalf of Bangalore Electricity Supply Company, invites tender in two parts (Techno Commercial Bid and Price Bid) through Karnataka Public Procurement Portal (https://kppp.karnataka.gov.in) for Implementation of Smart Business Management System by providing Web based Total Revenue Management (TRM) modules, GIS, BI & Analytical tools and other modules along with supply of Hardware, Software, Man Power, Stationaries and Consumables on System as a Service (SaaS) basis and other allied services in Sub-Divisions and Accounting Sections of Non RAPDRP areas in Chitradurga Area Zone (CTAZ) and Bangalore Rural Area Zone (BRAZ).

3. The Schedule of Availability, submission and opening of bid documents:

1. Enquiry No.	**BESCOM/2023-24/OW/WORK_INDENT149 dated 05.03.2024**
2. Tender processing fee	Refer https://kppp.karnataka.gov.in
3. Earnest Money Deposit	Refer Tender Document
4. Approximate Estimated Value	**Rs. 118.612 Crores** including GST
5. Date of availability of Bids	**07.03.2024 onwards**
6. Due date for submission of Bids	**On or Before 15.04.2024 12.30Hrs**.
7.Tender System	Please refer Karnataka Public

	Procurement Portal website
8. Date of opening of Techno commercial bid	**16.04.2024 @ 14.45Hrs.**
9. Date of opening of Price Bid	Price Bids of Responsive Bidders will be opened in the Karnataka Public Procurement Portal.
10. Name of the Work	Implementation of Smart Business Management System by providing Web Based Total Revenue Management (TRM) Modules, GIS, BI & Analytical tools and other modules along with supply of Hardware, Software, Man Power, Stationaries and Consumables on the basis of System as a Service (SaaS) and other allied services in Sub-Divisions and Accounting Sections of Non-RAPDRP areas in Chitradurga Area Zone (CTAZ) and Bangalore Rural Area Zone (BRAZ).
11. Description of Work	Implementation of Smart Business Management System by providing Web Based Total Revenue Management (TRM) Modules, GIS, BI & Analytical tools and other modules along with supply of Hardware, Software, Man Power, Stationaries and Consumables on the basis of System as a Service (SaaS) and other allied services in Sub-Divisions and Accounting Sections of Non-RAPDRP areas in Chitradurga Area Zone (CTAZ) and Bangalore Rural Area Zone (BRAZ).
12. Schedule of requirements	As mentioned in the tender document
13. General Terms and Conditions	As mentioned in the tender document
14. Scope of the work and Specifications	As mentioned in the tender document
15. Price Bid	The Bidder shall furnish the prices on the Karnataka Public Procurement Portal in the option of '' Final financial offer''
16. Remarks	If a bandh or holiday falls on any of the scheduled date, then the next working date shall be considered as scheduled date (between mentioned working hours).

4. Issue of Tender documents.

Bidders can download the tender documents from Karnataka Public Procurement Portal (Free of cost) 7th March 2024 onwards until the due date of submission of the bid.

5. Submission of tender documents

All the Tender Documents shall be submitted through Karnataka Public Procurement Portal on or before Last date of bid submission as mentioned in Karnataka Public Procurement Portal. The technical bids will be opened on date mentioned in the Karnataka Public Procurement Portal. Date of opening of Price Bids will be intimated at a later date.

6. Parties who may bid

Bidder having requisite qualification as per Qualifying Requirement (QR) may participate in the bid.

7. Pre bid:

i. A Pre bid meeting will be held at Conference hall, BESCOM, Corporate office, Belaku Bhavana, Bengaluru on **18.03.2024 at 14:45 Hrs**. The purpose of the meeting will be to clarify doubts on scope of work, and any issues regarding the bidding documents in general which are raised at that stage. Interested bidders or their representative limited to 2 (two) persons may participate in the said meeting for any clarification before submission of their offers.

ii. The bidders are advised to submit their query, if any, in writing in advance prior to the pre-bid meeting i.e., before **18.03.2024 upto 14.45Hrs** to the email ID: bescommarketing@gmail.com or gmcrbescom@gmail.com or hard copy to The General Manager (Customer Relations), Corporate Office, BESCOM, K. R. Circle, Bengaluru – 560 001. Non- submission of hard copy / Non-attendance to the pre-bid meeting will not be a cause for disqualification of Bidders, but at the same time shall not entitle to raise any query at a later date.

iii. If there is any discrepancy or obscurity in the meaning of any clauses of the bid document, all such queries need to be sent to G. M. (Customer Relations) via mail to bescommarketing@gmail.com or gmcrbescom@gmail.com prior to and during pre-bid meeting. The clarification given in pre bid meeting shall be final and binding on the bidder.

8. Notifications/ Amendments/ Addendum of Bidding Documents:

i. At any time prior to the deadline for submission of bids, BESCOM may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the Bidding Document by amendment (s).

ii. The amendment will be notified in the Karnataka Public Procurement Portal. BESCOM will bear no responsibility or liability

arising out of non-acknowledgment of the same by all the prospective Bidders before submitting the Bid.

iii. In order to afford prospective Bidders reasonable time in which to take the amendment into account in preparing their bids, BESCOM may, at its discretion, extend the deadline for the submission of bids as deemed fit.

iv. Such amendments, clarifications, etc., shall be binding on the Bidders and will be given due consideration by the Bidders while they submit their bids and invariably enclose such documents as a part of the bid.

9. EARNEST MONEY DEPOSIT:

a) The Bidders shall pay an EMD of Rs**. 118.62 Lakhs (Rs One Crore, Eighteen Lakhs, Sixty Two Thousands only).** Up to **Rs.10-Lakhs (Rupees Ten Lakhs only)** shall be paid electronically through any of the e-payment modes mentioned in the Karnataka Public Procurement Portal and the balance of **Rs. 108.62 Lakhs (Rupees One Crore, Eight Lakhs, Sixty Two Thousands Only)** shall be in the form of Bank Guarantee (BG) drawn on any Nationalized Bank. Original Bank Guarantee shall be submitted on or before the last day for bids submission i.e., **15th April 2024 at 12.30Hrs** at the office of the General Manager (CR), 3rd Floor, Corporate Office, BESCOM, K. R. Circle, Bengaluru – 560 001 .Copy of BG shall be uploaded in the Karnataka Public Procurement Portal.

b) The earnest money deposit shall remain valid for 180 days from the schedule date of submission of bid documents.

c) Instruments having fixed validity issued as earnest money deposit for the tender shall be valid for 45 days beyond the validity of the tender

d) Any tender not accompanied by an acceptable earnest money deposit and not secured as indicated in Sub-Clauses 9 (a), (b) and (c) above shall be rejected by the Employer as non-responsive

e) The earnest money deposit of unsuccessful Tenderers will be returned within 30 days of the end of the tender validity period specified in Sub-Clause 9 (b)

f) The successful bidder's Bid Guarantee will be discharged when the Tenderer has signed the Agreement and furnished the required Performance Security as stipulated elsewhere in the Bid Documents

g) Bids shall be rejected, in case, the requisite EMD is not deposited.

h) The deposit towards EMD shall not carry any interest.

i) Permanent EMD will not be considered.

j) The earnest money deposit shall be liable for forfeiture in the following cases:

i. If during the period of Bid validity, the bidder unilaterally withdraws or modifies its bid as a whole or in part; or

ii. In case of successful bidder, if the bidder fails to accept the order unconditionally or fails to furnish the contract performance guarantee as per stipulation of bid documents; or

iii. If any cartel is formed by the bidders in their quotations; or

iv. In case of successful bidder, if the bidder fails to implement the Pilot operation successfully; or.

v. (a) if the Tenderer withdraws the Tender after tender opening during the period of tender validity;
(b) if the Tenderer does not accept the correction of the Tender Price; or
(c) in the case of a successful Tenderer, if the Tenderer fails within the specified time limit to
(i) sign the Agreement; or
(ii) furnish the required Security deposit

9.1 E-payment mode for Tender Processing Fee or the EMD Payment up to **Rs. 10 Lakhs shall be made through any of the following modes of e-Payment**.

- Credit Card/ Debit card
- Net Banking
- NEFT / RTGS
- Over-the-Counter (OTC)
- IMPS

NOTE: - Tender Processing Fee **or the EMD Payment up to Rs. 10 Lakhs** payment at Karnataka Public Procurement Portal is through bank gateway as indicated in the Karnataka Public Procurement Portal.

For further clarification, contact Karnataka Public Procurement Portal**.**

Help Desk: Phone No: 080-46010000/68948777
+91-80-22230960 / 22234115 E-mail:**support@eprochelpdesk.com**

Note: In Karnataka Public Procurement Portal, Contractor has the option of withdrawing the Bid by digitally signing to withdraw/cancel bid before the bid submission time /Date.

10. Language of Bid:

The bid prepared by the bidder and all correspondences and documents relating to the bid, exchanged by the bidder and BESCOM, shall be written in English or Kannada language only. Failure to comply with this condition shall disqualify a bidder.

11. Currencies of Bid and Payment:

All prices shall be quoted by the bidder in "Indian Rupees" (INR) only.

12. Period of validity of Bid:

i. The bid shall remain valid for a period of 180 (One hundred and Eighty) days from the schedule date of bid submission. A bid, valid for a shorter period shall be rejected by BESCOM as non-responsive.

ii. In exceptional circumstances, BESCOM may solicit the Bidder's consent to extend the period of validity. The request and the response thereto shall be made in writing (including Fax or E-Mail). In such an event the Bid Security provided under Clause 9.0 shall also be extended by the same period as the extension in the validity of the Bid. A Bidder may refuse the request without becoming liable for forfeiture of his Bid Security. A Bidder agreeing to the extension will not be required or permitted to modify its Bid.

13. Information required with Technical & Price proposal:

i. The bid must clearly indicate the name of the bidder, the type of material/services to be supplied/ provided. For purpose of these clauses, a substantially responsive Bid is one, which conforms basically to all the terms and conditions of the Bidding Documents without material deviation & confirming to technical specifications. Bidder shall furnish the bid form and bidders information as per Annexure -IV & V.

ii. Documentary evidence in respect of qualifying requirements shall be uploaded by the bidder in the form of Electronic/scanned copies in the Karnataka Public Procurement Portal by the participating Bidders.

14. Price Proposal:

i. The Bidder shall quote item wise Prices in the Karnataka Public Procurement Portal platform including GST and statutory levies.
ii. The Bidder shall quote price per installation including GST, further bidder shall specify the GST percentage in the provision available in the Karnataka Public Procurement Portal platform.
iii. The price quoted for Item – 2 will be considered as a rate contract. The payment to the successful bidder for this item shall be made on actual utilization basis as per the requirement of the BESCOM, BESCOM reserves the right to utilize said services from the Bidder during anytime in the contract period as per BESCOM Norms. The Bidder shall provide said services at the accepted price during the contract period. The Bidder has no claim on the minimum quantity for this Item during the contract period for non-utilisation of the services. BESCOM reserves right to cancel the rate contract during the performance of the contract period.

iv. The Bidders shall quote FIRM prices. The prices shall be Firm throughout the period of Contract. Prices should be quoted on, per each Active/Live installation per month basis but maintain all the installations both active and inactive for further processing till complete arrears recovery or waive off of Arrears, which are migrated from the existing service provider.
v. The prices shall be quoted in Indian Rupees (INR).
vi. GST or any statutory levies shall be allowed as per the prevailing rates during the period of contract.

15. The Bid Process

i. **Cost of Bidding:** The Bidder shall bear all costs and expenses associated with preparation and submission of its bid including post-bid discussions, technical and other presentations etc., and BESCOM will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

ii. **Understanding of Bid Documents:** A prospective Bidder is expected to examine all instructions, forms, terms and specifications in the Bid documents and fully inform himself as to all the conditions and matters which may in any way affect the scope of work or the cost thereof. Failure to furnish all information required by the Bid document or submission of a Bid not substantially responsive to the Bid document in every respect will be at the Bidder’s risk and may result in the rejection of its bid.

iii. **Clarifications on Bid Documents:** If the prospective Bidder finds discrepancies or omissions, in specifications and document or is in doubt as to the true meaning of any part, he shall at once make a request, in writing, for an interpretation/clarification, to BESCOM. The BESCOM, then, will issue interpretation(s) and clarification(s) as he

may think fit in writing. After receipt of such interpretation(s) and clarification(s), the Bidder may submit his bid but within the time and date as specified in the Invitation to Bid. All such interpretations and clarifications shall form a part of the Bidding Document and shall accompany the Bidder's Proposal. A prospective Bidder requiring any clarification on Bidding Document may notify BESCOM in writing. BESCOM will respond in writing /upload in the Karnataka Public Procurement Portal /issue corrigendum/issue instructions in the portal to any request for such clarification of the Bidding Document as per the time lines given in the tender document. Verbal clarification and information given by BESCOM or his employee(s) or his representative(s) shall not in any way be binding on BESCOM.

16. Preparation of Bids

i. Language Of Bid: The bid prepared by the Bidder and all correspondences and documents relating to the bid, exchanged by the Bidder and BESCOM shall be written in the English or Kannada language, provided that any printed literature furnished by the Bidder may be written in another language so long as accompanied by an English or Kannada translation of its pertinent passages. Failure to comply with this, may disqualify a bid. For purposes of interpretation of the bid, the English or Kannada translation shall govern.

ii. Documents Comprising The Bid:

a. The Bidder shall complete the Bid Form inclusive of Price Schedules, Technical Data Requirements etc. furnished in the Bidding Documents as detailed above, indicating for the services to be rendered, a brief description of services, quantity and prices and upload in the Karnataka Public Procurement Portal.

b. The Bidder shall also upload documentary evidence to establish that the Bidder meets the Qualification Requirements as detailed in the Tender.

c. The Earnest Money Deposit shall be uploaded /furnished in accordance with the EMD clause

17. Submission of Bid

i. The bids shall be uploaded in the Karnataka Public Procurement Portal, on or before the last date and time of submission of bids. Bids not submitted through Karnataka Public Procurement Portal and non-submission of EMD will be disqualified.

ii. The bid shall contain no interlineations, erasures or overwriting except as necessary to correct errors made by the Bidder, in which case such corrections shall be initialed by the person or persons signing the bid.

iii. All the documents in support of qualifying requirements and all necessary documents shall be scanned and uploaded in the Karnataka Public Procurement Portal website.

18. Deadline For Submission of Bids

i. Bids must be uploaded in the Karnataka Public Procurement Portal on or before **15.04.2024 12:30 Hours**.

ii. BESCOM may, at its discretion, extend this deadline for the submission of bids by amending the Bidding Document, in which case all rights and obligations of BESCOM and Bidders previously subject to the deadline will thereafter be subject to the deadline as extended.

19. Modification And Withdrawal of Bids

i. The Bid submitted once will be final and not allowed for any modification.

ii. No bid may be withdrawn in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder on the Bid Form. Withdrawal/modification of a bid during this interval may result in the Bidder's forfeiture of its bid security [EMD]

20. Bid Opening

i. BESCOM will open bids submitted through Karnataka Public Procurement Portal in the presence of Bidders' representatives (up to 2 persons) who choose to attend at the date and time for opening of bids or in case any extension has been given thereto, on the extended bid opening date and time notified to all the Bidders in Karnataka Public Procurement Portal. The Bidders' representatives, who are present, shall sign in a register evidencing their attendance.

ii. The Bidders' names, bid withdrawals and the presence or absence of the requisite EMD and such other details as BESCOM, at its discretion, may consider appropriate will be announced at the techno- commercial bid opening.

iii. No electronic recording devices will be permitted during bid opening.

iv. The price bids of all the Techno-Commercial responsive bidders shall be opened in the presence of representatives (up to two per firm) of such bidders who choose to be present. The date and time of opening the price bid shall be intimated later.

21. Clarification of Bids

To assist in the examination, evaluation and comparison of bids BESCOM may, at its discretion, ask the Bidder for a clarification of its bid. The request for clarification and the response shall be in writing and no change in the price or substance of the bid shall be sought, offered or permitted.

22. Preliminary Examination

i. BESCOM will examine the bids to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether all the necessary documents have been properly uploaded, and whether the bids are generally in order.

ii. BESCOM may waive any minor informality or non-conformity or irregularity in a bid which does not constitute a material deviation, provided such waiver does not prejudice or affect the relative ranking of any Bidder.

23. Contacting the BESCOM

Bids shall be deemed to be under consideration immediately after they are opened and until such time official intimation of award/rejection is made by BESCOM to the Bidders. While the bids are under consideration, Bidders and/or their representatives or other interested parties are advised to refrain from contacting by any means, BESCOM and/or his employees/representatives on matters related to the bids under consideration. BESCOM, if necessary, will obtain clarifications on the bids by requesting for such information from any or all the Bidders, either in writing or through personal contacts as may be necessary. Bidders will not be permitted to change the substance of the bids after the bids have been opened.

24. Techno – Commercial Evaluation:

i. For purpose of these clauses, a substantially responsive Bid is one, which conforms basically to all the terms and conditions of the Bidding Documents without material deviation & confirming to technical specifications.

ii. The Techno-commercial Bids will be evaluated generally on the following points but not restricted to the same.
   a. Payment of the EMD
   b. Qualifying Requirements
   c. Completeness of the offer to carry-out all the works as per requirement.
   d. Bid validity
   e. Acceptance to all terms and conditions of the tender to be declared by

the Bidder as per Annexure XIII

iii. A bid determined as not substantially responsive will be rejected and may not subsequently be made responsive by the Bidder by correction of the non- conformity.

25. Evaluation of Lowest Bidder: The following criteria will be followed for the evaluation of the Lowest commercial bidder.

1. The bidder shall quote the price individually for both the 2 items provision provided in the Karnataka Public Procurement Portal. The price entered in the Karnataka Public Procurement Portal shall be inclusive of all applicable taxes and bidder shall provide the Tax break up in the Karnataka Public Procurement Portal.

2. Lowest price will be evaluated based on the weightage of the service item as follows,

a. The weightage for Item Code : TRM_01 i.e. "Price for Supply & Maintenance of Web-based Total Revenue Management Software consists of all the modules as described in the scope of work, including supply and maintenance of hardware, software, integrated SBD, Server setup, Support Man Power, Stationaries, Consumables, Internet Connectivity, etc., **on System as a Service (SaaS) basis model**" is 70.30weightage.

b. The weightage for Item Code : TRM_02 i.e. "Providing Manpower resource for Meter Reading and issuing of energy bills at the spot as per the scope of work and other activities as desired by BESCOM" is 29.70 weightage.

3. The above weightage percentage is arrived based on item wise estimated cost over the total estimated cost.

4. The price quoted by the bidder in the Karnataka Public Procurement Portal for each item will be multiplied by the respective weightage as stated above. The Summation of the final value after multiplying with the weightage will be the price evaluation index.

5. The least price evaluation index quoted bidder shall be considered as the lowest bidder of the Tender. Following is the evaluation illustration.

Sl. No.	Description	**Example Price to be quoted in the KPP Portal including GST** (in INR)	Weightage	Price Evaluation index (Rounded to 3 decimal points)
1	Cost of Supply & Maintenance of Web-			

	based Total Revenue Management Software consists of all the modules as described in the scope of work, including supply and maintenance of hardware, software, integrated SBD, Server setup, Support Man Power, Stationaries, Consumables, Internet Connectivity, etc., **on System as a Service (SaaS) basis model.** Rate shall be quoted Per Active Installation Per Month	5.00	70.30	351.500
2	Cost of Providing Manpower resource for Meter Reading and issuing of energy bills at the spot as per the scope of work and other activities as desired by BESCOM. Rate quoted shall be Per active bill per month issued by the Firm's Meter Reader.	10.00	29.70	297.000
Price Evaluation Index Total				648.500

Bidder having least Price Evaluation Index Total will be treated as lowest commercial bidder.

6. The item wise rates quoted in the KPP portal by the **Bidder having least Price Evaluation Index total** will only be considered for negotiation/award.

Note : The above illustrated price sheet template is not possible to create in the Karnataka Public Procurement Portal**, as such the existing works tender price sheet template is used for this tender. Therefore, the value indicated against "Actual Quantity" in the price bid / schedule of** Karnataka Public Procurement Portal **shall be read as "Weightage" and the amount shown in the** Karnataka Public Procurement Portal **after multiplying quoted item rate per active installation per month with that of weightage shall be read as "Price Evaluation Index" of that item and sum of such "Price Evaluation Index" is the "Price Evaluation Index Total". The Bidder who has quoted least Price Evaluation Index total will be treated as lowest quoted Bidder.**

7. All evaluated bid prices (**Price Evaluation Index Total)** of all the Bidders shall be compared among themselves to determine the lowest evaluated bid and, as a result of this comparison, the lowest Bid will be selected for the award of the Contract.

8. The prices of all such item(s) against which bidder has not quoted rates/amount (viz. items left blank or quoted zero or against which '-'is indicated) in the schedules will be treated that these item prices are deemed to have been included in other item(s)

26. Negotiations:

It is absolutely essential for the Bidders to quote the lowest price at the time of making the offer in their own interest, as BESCOM will not enter into any price negotiations, except with the lowest quoting bidder, whose offer is found to be fully technically compliant.

27. Issue Of Contract Order

27.1 Award Criteria

i. BESCOM will place LOI on the successful Bidder whose bid has been determined to be substantially responsive and has been determined as the lowest evaluated bid, provided further that the Bidder is determined to be qualified to perform the Contract satisfactorily. BESCOM shall be the sole judge in this regard.

ii. Bidder shall execute pilot operation for a period of Two months in one SDO in each Circle selected by GM (CR) at free of cost as per the scope of the Tender. The piloting shall be completed within the period of Two-calendar months from the date of LOI in all respects

iii. After the successful completion of pilot execution and receipt of Performance Guarantee, BESCOM shall issue the Detailed Work Award (DWA) to the vendor. Failure to execute the pilot operation satisfactorily is liable for forfeiture of the EMD apart from dis-qualification of the bid.

iv. On successful completion of pilot execution, the General Manager (CR) will issue the Go-Live confirmation to all the accounting units.

v. Bidder shall roll out the project to entire BESCOM within two months from the date of Go- Live confirmation and availability of the database from the existing service provider, failing which penalty will be initiated. Any delay due to want of inputs/data and in time approvals from BESCOM will be considered and suitable additional time shall be extended for roll out.

27.2 Right To Accept Any Bid And To Reject Any Or All Bids:

BESCOM reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to award of Contract, without thereby incurring any liability to the affected Bidder or

Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for BESCOM's action.

27.3 No Commitment To Accept Lowest Or Any Tender:

BESCOM shall be under no obligation to accept the lowest or any other offer received in response to this tender notice and shall be entitled to reject any or all offers including those received late or incomplete offers without assigning any reason whatsoever. BESCOM will not be obliged to meet and have discussions with any bids, any or to listen to any representations.

27.4 Notification Of Award

Prior to the expiration of the period of bid validity and extended validity period, if any, BESCOM will notify the successful Bidder in writing by registered letter or email, that its bid has been accepted.

28. Contract Period

The initial contract shall be valid for a period of two years from the date of issue of Detailed Contract Award (DWA) or Go live of the project at all accounting units. The Contract may be extended at the discretion of BESCOM for further period of another one year based on the performance of the agency on mutually agreed terms and conditions, if BESCOM desires so.

29. Acceptable Dispute/legal Redressal Mechanism:

i. In case of any dispute arising out the contract, the same shall normally be settled amicably through meeting between the BESCOM and the vendor at the appropriate level. The decision of the MD, BESCOM is final.

ii. If the Contractor is not satisfied with the decision taken by the Employer, the dispute shall be referred by either party to Arbitration within 30 days of the notification of the Employer's decision

iii. If neither party refers the dispute to Arbitration within the above 30 days, the Employer's decision will be final and binding.

iv. The Arbitration shall be conducted in accordance with the arbitration procedure stated in the clause vii.

v. The disputes arising out of the contract shall be exclusively within the jurisdiction of Bengaluru Court only

vi. **The Bidder should not have any court cases/ legal disputes with BESCOM.**

vii. Arbitration (Clause 24)

The procedure for arbitration shall be as follows:

(a) In case of dispute or difference arising between the Employer and the Contractor relating to any matter arising out of or connected with this agreement it shall be settled in accordance with the Arbitration and Conciliation Act 1996. The disputes or differences shall be referred to a Sole Arbitrator. The Sole Arbitrator shall be appointed by agreement between the parties; failing such agreement, by the Appointing Authority (any one of the Organizations as per list enclosed in Annexure)
(b) Arbitration proceedings shall be held at Bengaluru, Karnataka, India
(c) The cost and expenses of arbitration proceedings will be paid as determined by the Arbitrator. However the expenses incurred by each party in connection with the preparation, presentation, etc., shall be borne by each party itself.
(d) Performance under the contract shall continue during the arbitration proceedings and payments due the Contractor by the Employer shall not be withheld, unless they are the subject matter of the arbitration proceedings.

30. Communication mode:

The bidders, for communicating with BESCOM, for this job may use the following mail-Id bescommarketing@bescom.co.in or gmcrbescom@gmail.com or hard copy of letters to General Manager (Customer Relations), Corporate Office, BESCOM, K. R. Circle, Bengaluru – 560 001.

31. Representative of vendor:

i. The successful bidder is required to nominate one person exclusively for this project from commencement to completion as a Single-Point of contact, with whom BESCOM will interact on all matters related to the contract.

ii. The successful bidder has to specifically furnish to BESCOM, the name, designation, mobile no., residential phone no. of his authorized representative.

32. Sub-Contracts:

No sub-contracts are allowed. The bidder has to provide all services.

33. QUALIFYING REQUIREMENTS:

The bidder having the following pre-qualifying requirements are eligible to participate in the tender:

The essential minimum qualifying requirements are as under

Sl. No.	Qualifying Requirements	Documents to be uploaded
	Technical Requirements:	
1	The bidder should be a registered as a Private Limited or Public Limited under companies act 2013 or a Partnership Firm or a LLP Firm or a Proprietorship Firm and also registered with EPF, ESI, GST and Income Tax Departments.	All Certificates related to registration are to be uploaded.
2	The bidder should have ISO 9001-2008 or above version pertaining to QMS (Quality Management System) and ISO 27001-2013 or above version pertaining to ISMS (Information Security Management system) certification related to information technology as on the date of the tender notification, ISO 20000-1:2011 or Above certification software/IT related services. Bidder should own these Certificates as on the date of tender notification.	Copy of certificates shall be uploaded.
3	The Bidder must have been assessed and possess a valid SEI/CMMI Institute certified CMMI level 4 or above. Bidder should own this certificate as on the date of tender notification.	Copy of SEI/CMMI certificates or publish list shall be uploaded.
4	The Bidder should have experience of implementing “Billing & Collection Software solution” OR “Web based Total Revenue Management Software”; through its own software or through COTS (SAP/Oracle, etc.) software in at least two Govt. undertaking DISCOM/ESCOMs in India during last five years, but experience is must for a	Copy of orders and performance certificate for the proof of experience shall be uploaded and the details shall be filled in the format enclosed as **Sch-3 (1 of 9)** of Techno-Commercial sheet.

	continues period of Twelve months in each utility and project is operational at least in any one utility as on the date of the bid. Out of the above projects, One project should be in any ESCOMs of Karnataka covering at least 34.46 Lakhs bills per month.	
5	The bidder should be an OEM (Original Equipment Manufacturer) or authorized dealer of the TRM Software solution, which is proposed for this tender. The proposed TRM Software Solution product should have the following modules and same has been successfully implemented and working for a period of at least one year in any Govt undertaking DISCOMs/ESCOMs in India. (1) Billing (2) Collection (3) Metering (4) Disconnection & Reconnection (5) Energy Audit (6) New Connection (7) **MobileApp** (8) GIS Based customer Indexing and asset mapping (9) GIS Based integrated network analysis module (10) Management Information System (MIS) (11) Web Self Service (12) Meter Data Management System (13) Identity and Access Management	If the bidder is an authorized dealer then bidder shall submit the Manufacturer Authorization Form (MAF) as per the **Annexure-VI** If the bidder himself is the OEM then bidder shall provide a self declaration on the letter head in this regard shall be uploaded. Following supporting documents / evidences for the proof of qualification of the OEM shall be uploaded and the details shall be filled in the format enclosed as **Sch-3 (2 of 9)** of Techno-Commercial sheet. 1. DWA clearly specifying the list of modules and consumers/ installations covered

	system (14) **System Security Requirement** (15) **Asset Management** (16) **Maintenance Management** (17) Pre-paid functionality (18) BI & Analytical Tools (19) CRM/Consumer information and service system	in the project. 2. Performance Certificate issued by the Client, not below the rank of Executive Engineer.
6	Bidder as a prime contractor should have satisfactorily completed at least one similar work such as experience of implementing "Billing & Collection Software solution" OR "Web based Total Revenue Management Software solution of value not less than Rs. **59.31** Crores during the last 5 years **Note:** Updated to the FY in which the tenders are invited. The value of the completed works shall be given a weight of 10% per year to bring them to the price level of the FY in which the tenders are invited	Copy of the DWA/PO and performance certificate shall be uploaded and the details shall be filled in the format enclosed as **Sch-3 (3 of 9)** of Techno-Commercial sheet.
7	Bidder should have generated at least 413.47 lakhs Electricity bills in any one year, during the last 5 years.	Copy of the DWA/PO and performance certificate shall be uploaded and the details shall be filled in the format enclosed as **Sch-3 (4 of 9)** of Techno-Commercial sheet.
8	Bidder should be an OEM/Supplier of the "Android OS Based integrated Spot Billing Devices (SBD)". The proposed Device OEM/ Supplier should have past experience in supply and maintaining at least One Thousand Two hundred & Twenty numbers SBD to any DISCOMs	The following documents shall be uploaded: i. Documentary evidence for the proof of OEM.

	of India in any one year during the last five years for the purpose of billing, spot collection and other activities. If the Bidder is a Supplier then MAF as per **Annexure-VII** from the OEM shall be submitted along with the required documentary evidence of the OEM who have met the past supply & maintenance.	ii. Copy of the DWA/PO and certificate for the proof of OEM, supply and maintenance of SBD. iii. If the Bidder is a Supplier, then MAF as per **Annexure-VII** along with the necessary documentary evidence of the OEM, if bidder is the OEM a self-declaration along with above mentioned documentary evidence. The details shall be filled in the format enclosed as **Sch-3 (5 of 9)** of Techno-Commercial sheet
9	The bidder should have at least 2 years experience in providing Man Power Services for Meter Reading activity and issue of bills to the consumer at the spot in any DISCOMs of India. The said work should be operational as on the date of the Tender.	Copies of Work Awards and satisfactory performance Certificates shall be uploaded and the details shall be filled in the format enclosed as **Sch-3 (6 of 9)** of Techno-Commercial sheet.
10	No Consortium/Joint Venture will be allowed as a part of bid.	Written Self-declaration on the letter head shall be uploaded
	Financial Requirements:	
11	The **Annual Turnover** of the Bidder in at **least two financial years in any of the previous five financial years i.e., (FY 2018-19, 2019-20, 2020-21, 2021-22 & 2022-23)** should not be	Certified copies of audited financial statements such as P&L statement, Balance sheets for the (**FY 2018-**

	less than **Rs. 118.612 Crores.** **Note :** The previous years turnover of the bidder is updated to the FY in which the tenders are invited. Financial turn over of previous years shall be given a weight of 10% per year to bring them to the price level of the FY in which the tenders are invited	**19, 2019-20, 2020-21, 2021-22 & 2022-23**) shall be uploaded and the details shall be filled in the format enclosed as Sch-3 (7 of 9) of Techno-Commercial sheet. In case, audited annual accounts for the FY 2022-23 is not finalized, provisional un-audited annual accounts duly certificated by the Chartered Accountant shall be uploaded.
12	The Liquid assets of the Bidder as on **15.03.2024** or at a later date before submission of the bid consisting of Cash at Bank + Term Deposits + Availability of fund based credit facility in any Nationalized/scheduled Bank should not be lesser than **Rs. 14.83 Crores**.	If the bidder has banking in multiple banks, then available Liquid assets balance mentioned above on a particular date i.e., as on **15.03.2024** or at a later date before submission of the bid should be the same date for all banks.The cash at bank, bank deposits and availability of fund based credit facilities shall be supported by a certificate issued by Nationalized/ scheduled Bank shall be uploaded. In case of Fund based credit facility, the certificate issued by the

		Nationalized/ Scheduled Bank duly mentioning sanctioned limits, funds utilized so far and balance available as on **15.03.2024** or at a later date, before submission of the bid shall be uploaded and the details shall be filled in the format enclosed as **Sch-3 (8 of 9)** of Techno-Commercial sheet
13	Bidders who meet the above specified minimum qualifying criteria, will only be qualified, if their available tender capacity is more than the total tender value. The available tender capacity will be calculated as under: Assessed available tender capacity = (A*N*1.5 - B) Where, A = Maximum value of works executed in any one year during the last five years ((updated to FY 2023-24 price level) taking into account the completed as well as works in progress. N = Number of years prescribed for completion of the works for which tenders are invited. B = Value, at FY-2023-24 price level, of existing commitments and on-going works to be completed during the next 2 years (period of completion of the works for which Tenders are invited)*	The bidder shall upload statements showing the value of existing commitments and on-going works as well as the stipulated period of completion remaining for each of the works listed should be countersigned by the Employer in charge, not below the rank of an Executive Engineer or equivalent and the details shall be filled in the format enclosed as Sch-3 (9 of 9) of Techno-Commercial sheet

III	General Requirements:	
14	Even though the Tenderers meet the above criteria, they are subject to be disqualified if they have: i) made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or ii) record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc.; and/or iii) participated in the previous Tender for the same work and had quoted unreasonably high tender prices and could not furnish rational justification.; and/or	Self declaration in the prescribed format as per **Annexure - X** shall be uploaded.
15	As on date of submission of the bid, the Bidder should not be under a declaration of ineligibility for corrupt or fraudulent practices with any of the State government or Central Government or PSU or Municipal agencies in India or Abroad at the time of submission. **OR** As on date of submission of the bid, the Bidder must not have been blacklisted or banned or debarred. **OR** As on date of submission of the bid, the Bidder who's work orders have been short closed due to non-performance or who's LOA is withdrawn by the owner due to inefficiency of the bidder in performing or implementing assigned	Self-Declaration for Not Blacklisting and Termination on Non-Judicial stamp paper of appropriate value, duly notarized as per **Annexure-XI** shall be uploaded. **Note**: The bidder shall declare on Non-Judicial stamp of appropriate value that the information furnished by them are true and correct. If BESCOM found that any misleading information and/or suppressing of the facts by the bidders, BESCOM shall reject the

	project in technically/financially are not eligible to participate in this bid.	bid and such bidder will be black listed including initiation of legal/criminal proceeding. The decision of the BESCOM shall be final in this regard.
16	Any Bidder from a country which shares a land with India will be eligible to bid in this tender only if the Bidder is registered with the Competent Authority. "**For details Please Refer Note 1**"	Registration certificate issued by the competent authority shall be uploaded.
17	A certificate for having read the clauses is required to be submitted/uploaded by the tenderer separately in the following format: I have read the clause regarding restrictions on procurement from a Bidder of a country which shares a land border with India; I certify that this Bidder is not from such a country or, if from such a country, has been registered with the Competent Authority. I hereby certify that this Bidder fulfils all requirements in this regard and is eligible to be considered. (Where applicable, evidence of valid registration by the Competent Authority shall be attached.) **Note:** **Procurement of Spare parts and other essential service support like Annual Maintenance Contract (AMC)/ Comprehensive Maintenance Contract (CMC), including consumables for closed systems from Original Equipment Manufacturers (OEM's) or their Authorized agents, shall be exempted from the requirement of**	Self-declaration in the prescribed format / certificate as per **Annexure – XII** shall be uploaded.

	registration as mandated under Government Order No: FD 455 Exp-12 2020 dated.25.08.2020. “**For details Please Refer Note 1**”	

Note 1:

As per the Government Order No. : FD 455 Exp-12 2020 dated.25.08.2020, FD 455 Exp-12 2020 dated. 10.03.2021 & : FD 455 Exp-12 2020 dated.29.03.2021-clarification to the Sl. No.10 & 11 above are as follows: “Bidder (including the term tenderer’, Consultant or service provider in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.
“Bidder from a country which shares a land border with India” for the purpose of this Order means:- a. An entity incorporated, established or registered in such a country; or
b. A subsidiary of an entity incorporated, established or registered in such a country; or
c. An entity substantially controlled through entities incorporated, established or registered in such a country; or
d. An entity whose beneficial owner is situated in such a country; or
e. An Indian (or other) agent of such an entity; or
f. A natural person who is a citizen of such a country; or
g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above.
I. The beneficial owner for the purpose of above clause will be as under: (i) In case of a company or Limited Liability Partnership, the beneficial owner is the natural person (s), who, whether acting alone or together, or through one or more juridical person, has a controlling ownership interest or who exercises control through other means. Explanation- a. “Controlling ownership interest” means ownership of or entitlement to more than twenty-five percent of shares or capital or profits of the company;

b. “Control” shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements;
(ii) In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;
(iii) In case of an un-incorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals;
(iv) Where no natural person is identified under (i) or (ii) or (iii) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;
(v) In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.
An Agent is a person employed to do any act for another, or to represent another in dealings with third person.
IN CASES WHERE SUB CONTRACTING IS PROVIDED: A certificate is required to be submitted/ uploaded by the Tenderer in respect on sub-contracting separately in the following format: “I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries; I certify that this bidder is not from such a country or, if from such a country, has been registered with the Competent Authority and will not sub-contract any work to a contractor from such countries unless such contractor is registered with the Competent Authority. I hereby certify that this bidder fulfils all requirements in this regard and is eligible to be considered. (Where applicable, evidence of valid registration by the Competent Authority shall be attached.)”
As per circular FD 455 Exp-12 2020 dated. 10.03.2021 : A Bidder is permitted to procure the raw materials, components, sub-assemblies etc from the vendor from countries which shares land border with India. Such vendor will not be required to be registered with the Competent authority, as this is not regarded as sub-contracting. However incase a Bidder has proposed to supply finished goods

procured directly / indirectly from the vendors from the countries sharing land border with India, such venders will be required to be registered with Competent authority.
As per circular FD 455 Exp-12 2020 dated.29.03.2021 Procurement of Spare parts and other essential service support like Annual Maintenance Contract (AMC)/ Comprehensive Maintenance Contract (CMC), including consumables for closed systems from Original Equipment Manufacturers (OEM's) or their Authorized agents, shall be exempted from the requirement of registration as mandated under Government Order No: FD 455 Exp-12 2020 dated.25.08.2020.

34. General:

i. Even though the Bidders meet above qualifying criteria, as per their statements they are subject to be disqualified if they have made misleading or false representations in statements and attachments submitted as proof of the qualification requirement. Tender not submitted through Karnataka Public Procurement Portal is liable to be rejected.

ii. BESCOM reserves the right to cancel or withdraw or modify the bid without assigning any reason for such decision. Such decision will not incur any liability whatsoever on the part of BESCOM consequently.

iii. BESCOM will not be responsible for not getting internet connection while downloading the Electronic Bid sheets/documents or while uploading their offers.

iv. Tender should be in two parts namely Part-I: Techno commercial Bid containing full technical particulars and commercial terms and conditions. Part- II: Price Bid containing prices.

35. GEOGRAPHICAL SCOPE

The list of sub-divisions with tentative no. of existing consumers is given in the Annexure-III.

36. These tenders are being invited, processed and awarded subject to condition that BESCOM shall have right to terminate the contract / descope the contract earlier than the contract period by giving 2 months prior notice in the following events:

i. At present, the 20 towns existing in the Non-RAPDPR area of BESCOM and are being provided with web based TRM solutions are included in the IPDS IT Phase – II project, consequent to successful implementation of IPDS IT Phase -II project, these towns are to be deleted from the scope of present tender and merged to the IPDS IT Phase – II scope

ii. In case, BESCOM is opt to implement AMI/Smart meter solution, the service provider shall agree for descoping / termination of the contract and hand over the data to the new vendor smoothly subject to two months prior notice from BESCOM or in case BESCOM is desired to retain the Head end Billing system, the service provider shall agree for reduced scope of service with reduced price.

iii. Since the tender is invited for a period of 2 years and extendable by another one year, during this period, the software developed should cope with any new technology, even if there is any change in the hardwares, software should be updated to the latest technology or for the changed hardwares and the agency should make necessary changes in the software without any additional cost to BESCOM, in the event if BESCOM desirous to retain the software.

37. These tenders are being invited, processed and awarded subject to condition that BESCOM shall have right to terminate the contract earlier than the contract period by giving 2 months prior notice in the event of BESCOM opt to any alternative solution in the Non-RAPDRP area

Section 'B'- Scope of work

1. **Overview**: BESCOM desires for "Implementation of Smart Business Management System by providing Web Based Total Revenue Management (TRM) Modules, GIS, BI & Analytical tools and other modules along with supply of Hardware, Software, Man Power, Stationaries and Consumables on the basis of System as a Service (SaaS) and other allied services in Sub-Divisions and Accounting Sections of Non-RAPDRP areas in Chitradurga Area Zone (CTAZ) and Bangalore Rural Area Zone (BRAZ)". The proposed work mainly comprises of deployment of Web based Total Revenue Management (TRM) application software consists of various modules, GIS, BI & Analytical tools and all the operating system and the database application, secured internet with necessary bandwidth, hosting DC/DRC, required Hardware's, stationaries, manpower and etc. as per requirements of the BESCOM.

The scope of work is broadly classified into following parts viz,

A. **Part-1- Hardware's**: Supply of all types of Hardware's (including Android OS based Spot billing device with integrated thermal printer as per the specification) and its maintenance during the contract period.
B. **Part-2 Software**: Supply and maintenance of Tested and secured web based Total Revenue Management application Software consisting Various Major Modules including customization and bug fixing during the contract period.
C. **Part-3**: Providing secured INTERNET including associated hardware with appropriate bandwidth to carryout day to day activities smoothly and Stationaries & Consumables.
D. **Part-4**: Providing required Man power support.
E. **Part-5:** Provision for Supply, configure and Installation of RFID/NFC permanent metallic sticker at Meter - **Deleted**.
F. **Part-6**: Provision for GIS Survey including supply for satellite imagery and plotting of assets on the map.
G. **Part-7:** Provision of manpower for Meter Reading and Issue of Bills at the Spot and other activities as desired by BESCOM (At the discretion of BESCOM, considered as a Rate Contract Item)

2. **Part-1: Supply of Hardware and its maintenance:** The Service provider is responsible for providing and maintaining of the following Hardware:

Sl. No.	Particulars	Sub- Division	Accounting Section	Cash Counters
1	Required number of Central Server's at a secured data center, and DRC using Cloud			

	Technology suitable for delivering the scope of services as per the bid document. On expiry of the contract period the ownership of the server should be transferred to BESCOM and			
2	No. of Desktop PCs	6 Nos	2 Nos	One Number for each Cash Counter
3	On line UPS	1x5KVA– 4hrs backup	1x2KVA-3hrs backup	1x2KVA-3hrs backup
4	Network Laser printer	1 Nos	1 No	
5	Slip Printer			One number for each Cash Counter
6	Spot Billing Device (SBD)	One Android OS based Integrated SBD with latest Technology for exchanging of data on real- time for each Meter Reader and each GVP's. Approximately one machine for every 2400 live installations and also provide 10 % spare SBD on the total quantity supplied. Spares devices shall be given to the custody of Sub-Divisional Officers. Faulty SBD shall be replaced with good one during the contract period. SBD's shall be replaced with brand new devices once in Three years at no extra cost		
7	Bar code scanner	-	-	One Number for each Cash Counter
8	Connectivity	Secured internet along with allied hardware, bandwidth to SDOs and Accounting Sections with appropriate Nodes. For other offices to access the web application over internet, access shall be given as required by BESCOM and other Government Offices.		

i. Android OS based Spot billing device with integrated thermal printer (hereafter called SPOT BILLING DEVICE or SBD) enabled with latest Technology as per the specification specified in the tender to exchange the billing data and other functionalities on real-time.

ii. SP shall provide branded new machines and equipment's, Invoice copies towards procurement of BOQ should be supplied to GM (CR) Corporate Office, BESCOM before raising the first invoice.

iii. Specification for the above items is as per **Annexure-II**. Any higher version is also accepted

iv. All the hardware supplied by the SP should be free from defects and maintained in good working condition.

v. The SP shall Supply and install updated licensed Antivirus software of reputed Company for PCs and maintain updates. No free Anti-virus software will be allowed.

vi. Claims against damages/loss to any equipment/hardware, provided by Successful Bidder, due to surge, fire, theft etc. shall not be entertained.

vii. Any damages to the property of BESCOM by the Successful Bidder through their personnel or equipment will be assessed and the same will be deducted from the payables to the Successful Bidder.

viii. Any up-gradation/ replacement to any hardware supplied by the Successful Bidder has to be borne by the Successful Bidder only.

ix. Reading entry shall be either manual or downloading through optical port or scanning using RFID technology or OCR Technology. The Device (SBD) shall support all the above said options.

x. PC Interface connecting cables shall be provided along with SBD.

3. Part-2: Software. Supply and maintenance of Tested and secured web based Total Revenue Management (TRM) application Software consisting following Modules including customization and bug fixing during the contract period

Sl. No.	MODULE	Features and objectives
	Billing	A comprehensive billing system will ensure that the BESCOM efficiently bill their customers for the services rendered. It should support the continuous billing to reduce the outstanding dues. Ensure the timely and accurate billing. The system will support the complaints handling functionally by providing short turnaround times for billing related customer queries.
	Collections	The system should provide different payment and information channels to customers and own staff to improve customer convenience for payments and enable collections for the energy billed, and a shorter metering-bill billing-collections (MBC) trade cycle

3		**Metering**	An Effective meter reading system would enhance the effectiveness of the measurement process. This would include accurate metering for all customers and tapping revenue loss through the identification and handing of exceptions
4		**Disconnection & Reconnection**	Recovery improvement and improvement in collection efficiency. The system should aim at improving recovery through a disciplined disconnection and reconnection mechanism that would serve as a deterrent for defaulters. This shall also provide updated information to CRM. System should be capable of generating the list of defaulting consumer i.e. the consumers who do not make payment of their bills by the due date or the date on which list is generated, whichever is later. System should be capable to accept report of action taken on such consumers and remind further action required to be taken during specified period as decided by DISCOMs.
5		**Energy Audit**	Monitor important distribution parameters, capture hierarchical view of energy accounting, Network assets of power distribution utilities, intelligent analysis tools for plugging loop holes and identifying revenue leakage, adding into perform network planning and management activities, calculate / identify technical and commercial losses at any point in the network.
6		**New Connection**	Shall facilitate the entry of new consumers into the system
7		**Mobile App**	Mobile app for all the Modules for easy operations in field and office as mentioned in the TENDER.
8		**GIS based customer Indexing and asset mapping**	Geographic Information System consists of a system for capturing, storing, checking, integrating, manipulating, analyzing and displaying geo data related to positions on the Earth's surface and data related to attributes of the entities/Customers in BESCOM areas. It pertains to both vector and raster GIS. The use of capabilities includes hardware, software and data, provided by a Geographic Information System specific to a set of user requirements. This is achieved through GIS mapping to pre-defined scale, generation of intelligence electrical network maps and super imposing them on the land base GIS maps and through customization and / or development of application software.
9		**GIS based integrated**	The module shall be able to perform several types of analyses on balanced or unbalanced three-phase, two-phase and single-phase systems that are operated in

	network analysis module	radial, looped, meshed or mixed configurations. The system shall be able to create "what-if" studies and performing simulations to evaluate the impact of modifications to existing network.
10	**Management Information System (MIS)**	The specification covers maintenance and generation of various management information reports required for top management, middle level management and respective unit offices. These are generally based on the data generated under different other packages covered in this section. The MIS Module should include ➢ Information capturing ➢ Information processing ➢ Information management ➢ Information based decision-making & reporting.
11	**Web Self Service**	The goal is to provide a high quality experience for the customers and business associates that will provide them a user friendly portal that will make it easy for them to communicate with the to the BESCOM though the web instead of direct Device calls or visits. This portal will also act as a source of information for the customers regarding policies and procedures. This in turn will improve customer satisfaction and reduce work load on the employees
12	**Meter Data Management System**	The main objective is to acquire meter data from System in all the available meter reading formats and select consumer meters automatically from remote avoiding any human intervention, Monitor important distribution parameters, use meter data for accurate billing purposes and generate exceptions and MIS reports for proper planning, monitoring, decision support and taking corrective actions on the business activities by the management. The type of meter may be Single phase or Three Phase, conventional meter and/or static meter, smart meter, pre-paid meter, Net meter, LT TVM, HT TVM, Open Access Meter, DLMS or Non DLMS meter, Category “A”, “B” or “C” meters, Meters for Consumer, DTs, Feeders, Meters installed at 11kV or 33kV or higher voltage consumers or feeders etc.
13	**Identity and Access Management System**	Identity management for user provisioning should have out of the box workflow for automating approvals for user access management, self-registration and self-care functionality for reducing the administrative load and manual intervention
		The system must be capable of generating log trails, which contain details about any read / write access to

14	**System Security Requirement**	sensitive data. Details must relate activity to an identifiable person. They must be configurable, so that filters and switches can be used to lower performance overheads and focus on areas of concern. It is important that the audit trail that is generated contain enough information to support after-the-fact investigation of loss or impropriety.
15	**Asset Management**	The system shall have the ability to identify a business entity/district to which the equipment/assets belongs and also should be able to reorganize Divisions, office codes, etc. in the case of organizational changes. The system shall have the ability to track from fixed assets to movable assets LINE assets (cables, conduits) to underground assets, which run across business entities
16	**Maintenance Management**	For better planning and co-ordination of various maintenance activities, reduce breakdowns by inculcating the culture of preventive and predictive maintenance, to maintain maintenance history, to review and control maintenance costs and providing a feedback to management for timely decision making.
17	**Pre-paid functionality**	The system shall have the ability to support pre-payment and capability to interface with prepaid application.
18	**BI & Analytical Tools**	BI Tool helps to convert this raw data into actionable insights that drives business decisions. BI Tool helps organisation leaders to leverage on this data to get a real-time overview of your business in the form of graphs, charts, summaries, and other informative reports. This helps organisations to make smarter, faster and better decisions. Users can take advantage of advanced features like what-If analysis and statistical analysis to identify the trends & anomalies.
19	**Consumer Information and service system**	For better serving the consumers for information of accounts, payments, service requests, complaints.

3.1 TECHNICAL SPECIFICATIONS of the above mentioned software modules are as here under :-

a. SYSTEM DESIGN AND ENGINEERING

The Bidder shall be responsible for detailed design and engineering of overall system, sub-systems, elements, system facilities, equipment, services, including systems application software etc., which shall be based on web design as well as Mobile Application design. All the software modules shall be designed to operate in a seamless

integrated manner. It shall include proper definition and execution of all interfaces/ integration with existing/ legacy/ future systems, equipment, material and services of Owner for proper and correct design, performance and operation of the project.

Bidder shall provide complete engineering data, drawings, reports, manuals and services offered etc., for Owner's review, approval and records.

b. SUPPLY OF EQUIPMENT AND MATERIAL

The Bidder shall also be responsible for inspection at manufacturer's works, supply, transportation, insurance, delivery at site, unloading, storage, complete supervision, installation and successful commissioning of all the equipment, systems and application software as envisaged in this tender.

Any item though not specifically mentioned, but is required to complete the project works in all respects for its safe, reliable, efficient and trouble free operation shall also be taken to be included, and the same shall be supplied and installed by the Bidder without any extra cost.

c. SPECIAL TOOLS AND ACCESSORIES

The bidder will be responsible for maintaining special tools, testing equipment's and accessories required during development stage, for day to day operation and maintenance of the system at his own cost.

d. INSTALLATION & IMPLEMENTATION

i. The bidder shall be responsible for installation of all identified hardware/ software, equipment etc. at site.
ii. The successful bidder shall be responsible for installation and configuration of software, hardware and other equipment's supplied to the satisfaction of the owner.
iii. Post Go-Live, the software vendor shall provide support to fix any bug related to implementation. The entire system would be considered as successfully installed when the software will run with actual live data at site for 1 month without any bugs (Bug is lacunae in the system that prevents/ delays an operation or performs a function within the system at suboptimal level/ at performance level lesser than that specified in this specification or provides incorrect operational data or provides incorrect results in any data format in the system) reported by the users.
iv. Demonstration of all the features of latest version of software;
v. Acceptance testing of the system thus implemented to the owner's satisfaction.

e. TESTING AND VERSION CONTROL:

i. Create a test environment at Corporate office by installing executable application software, database and other related software for testing the various functionalities of

the software Modules such as Meter Reading, Billing, Collection, Disconnection, Reconnection, Cash Counter software, SBD software, MRI software, Energy Audit, New Connection, Mobile Apps., GIS Based Customer Indexing and Asset Mapping, GIS Based Network analysis, MIS, Web Self Service, MDM, Identity Access Management, System Security, Asset Management, Maintenance Management, Pre-Paid Functionality, BI & Analytical Tools, Consumer Information Service System etc.,

ii. Integration of TRM system with various external / internal IT systems of BESCOM.

iii. Maintain the history of all previous versions of the software

iv. Any new version of the software shall be deployed only after testing and certification from, corporate office, BESCOM.

v. A 3-member team comprising of one BESCOM representative, one SP representative and one neutral member will evaluate compliance of the system to the UAT acceptance criteria specified below and take a decision on pilot clearance and final clearance.

F. PILOT OPERATIONS:

BESCOM will verify the following for pilot clearance:

(A) Compliance of the implementation to "all functionalities and integration with external / internal IT systems " requirements as specified in the tender.

(B) Implementation of Smart Business Management System by providing web based Total Revenue Management (TRM) Modules, GIS, BI & Analytical tools and other modules along with supply of Hardware, Software, Man Power, Stationeries and Consumables on System as a Service (SaaS) basis in one or more pilot Sub-Divisions/Divisions identified by BESCOM.

(C) The piloting shall be completed within the period of Two months from the date of handing over from the existing agency under NDA (Non-disclosure agreement) or LOI whichever is later. The Piloting comprises the UAT and the execution. Based on the above results, DWA will be issued to implement the services.

(D) Demonstration of performance desired for the entire system in the Non-RAPDRP area including future size for next 8 years and Operational Guarantees

(E) Pilot operation shall be carried out at bidder's own cost.

g. Final clearance for issuing DWA:

BESCOM will verify the following for final clearance:

(A) Successful completion of pilot and POC mentioned in the **(f).**

(B) Acceptance of prototype SaaS by BESCOM.

(C) Security audit of the system by a 3rd party agency engaged by BESCOM at the discretion of BESCOM.

(D) Compliance of terms and conditions of tender/LOI.

h. TESTING AND ACCEPTANCE PROCEDURES

Testing and quality assurance in software development is more rigorous since each component has to be more reliable, if it is to be reused. A system is tested at various stages of development and deployment. For example, each component is tested as a unit for checking the correctness of its own code. Further, the component is tested with its dependent components. After final release of the entire set of components, system is tested for the correctness of system functionality. Finally the components are further tested in simulated production load for performance and load analysis.

The bidder shall be responsible for the testing processes such as **planning** (includes preparing test plans and defining roles and their responsibilities), **preparation** (consists of preparing test specification, test environment and test data) and **execution** (includes testing at various levels like unit level, integration level, system level and production).

Test Plan

Test plans are prepared for each phase of testing. The initial test plan is created during the Project Planning phase. The initial test plan describes who performs which type of testing and when. Ideally master test plan covers all types of test i.e. from unit testing to production testing. The bidder is expected to submit the test plans to the BESCOM for approval. Any changes made to the test plan during the project life cycle should be communicated to the BESCOM for approval.

Test plans contains following items: Roles and responsibilities of test team

- Approach to testing
- Function testing
- Security testing
- User Interface and reports testing
- Concurrency testing
- Performance and Load testing
- Test Scenarios along with entry and exit criteria

- Test specifications
- Suspension and resumption criteria

Test scenarios

The bidder should prepare test scenario for each business scenario. A test scenario when executed should fulfill a business requirement as per the scope of business functionality. Test scenarios include following:

a) Test Specification - During the test specification phase, the test cases are specified. It consists of description of the input, process to be executed and a prediction of output results.
b) Test Environment - Component developer does unit testing and integration testing. Integration testing can be delegated to a specialized testing group. Each of the members in the testing group is provided with testing environment according to his/her role and responsibilities. Following is sample testing environment for testing:
    i. A workstation
    ii. A set of tools and applications required on workstation like access to user interface, browser etc.
    iii. Access to centralized document database (where all the project related documents are maintained)
    iv. Access to testing tools and defect logging tools
    v. Access to the central database or repository for development and unit testing (this database contains sample test data)
    vi. Access to deployed components

c) Test Data - Test data is prepared for testing at each stage. The test data should be prepared in such a way that it covers basic path and every alternate path of the code. The basic path and alternate paths are prioritized to capture relevant data. Tools can also be used to generate test data.

Test Execution

The following testing steps are usually employed in the project lifecycle. The bidder is expected to follow these steps.

a) Unit Testing - In unit testing, each piece of code has to be rigorously tested. At this stage testing is done according to the priority of path of code. All the test results are logged in the defect logging tools. After every the completion of testing, code is corrected for defect logs. This process is iterative till criteria for successful testing is reached.
b) Integration Testing - Upon completion of unit testing, integration testing begins. The purpose is to ensure distinct components of the application still work in accordance to customer requirements. Test sets will be developed with the express purpose of exercising the interfaces between the

components. This activity is to be carried out by the Test Team. Integration test will be termed complete when actual results and expected results are either in line or differences are explainable/acceptable based on client input.

c) Incremental Integration Testing - Continuous testing of an application as new functionality is added.

d) System Testing - System testing is performed when all the components are delivered to central repository prior to the release of the software. The testing is done on priority basis of business processes. All the defects are logged and assigned to respective component owners. The component and unit testing is performed after the correction of code. However, it may depend on size and type of individual test specifications. Impact analysis is useful to narrow done testing efforts by identifying critical test cases affected due to code change.

e) Pre-Production Testing – Pre-Production testing is done simulating the production load. Test data is either prepared or generated from the tools. This testing is used to evaluate performance, load capacity and concurrency. Load testing tools can also be used for this purpose. Following special type of testing are done during Pre-production Testing Phase:

f) Regression Testing - The objective of regression testing is to ensure software remains intact. A baseline set of data and scripts will be maintained and executed to verify changes introduced during the release have not “undone” any previous code. Expected results from the baseline are compared to results of the software being regression tested. All discrepancies will be highlighted and accounted for, before testing proceeds to the next level.

g) Performance Testing - Although performance testing is described as a part of system testing, it can be regarded as a distinct level of testing. Performance testing will verify the load, volume, and response times as defined by requirements.

h) Load Testing - Testing an application under heavy loads, such as the testing of a website under a range of loads to determine at what point the systems response time degrades or fails.

i) Installation Testing - Testing full, partial, or upgrade install/uninstall processes. The installation test for a release will be conducted with the objective of demonstrating production readiness. This test is conducted after the application has been migrated to the client’s site. It will encompass the inventory of configuration items (performed by the application’s System Administration) and evaluation of data readiness, as well as dynamic tests focused on basic system functionality. When necessary, a sanity test will be performed following the installation testing.

j) Security/Penetration Testing - Testing how well the system protects against unauthorized internal or external access, willful damage, etc. This type of testing may require sophisticated testing techniques.

k) Recovery/Error Testing - Testing how well a system recovers

from crashes, hardware failures, or other catastrophic problems.

l) Acceptance Testing – During the test scenarios definition, for each of the business scenario, an acceptance criterion is defined. Acceptance criteria include expected behavior of the s/w component and the expected results (data). Expected results form a part of the Exit Criteria. In addition to expected result and behaviors, some conditions are also specified in the exit criteria. They can be:

Number of bugs to be discovered for a functional module. This depends on size of the functionality and is an indicator of amount of testing done.

All High, medium or low-priority errors from System Test must be fixed and tested.

Acceptance Criteria: The bidder needs to get the acceptance criteria approved from the BESCOM for all the functional components of the system. The Acceptance Criteria for each release into production environment will be agreed upon by the bidder in consultation with the BESCOM prior to release from Testing to production environment. After installation, if any bug is reported or there is non-compliance to requirements then a proper procedure should be followed. End-user should report ("Change Request") to his/her supervisor about the bug that will in turn get forwarded to Project Manager (PM). PM will forward the List of change request to the successful bidder. After the bug is fixed, it should be reflected in the production copy after testing it.

m) **Performance Testing -** The bidder has to test and demonstrate the operational performance requirement after completion of entire scope. This will be part of acceptance testing. The system will be taken over by owner only after successful operational performance testing. The bidder has to arrange necessary hardware / software to demonstrate the performance testing.

i. TESTING, COMMISSIONING & SUCCESSFUL OPERATION

The scope includes testing and commissioning & implementation of all application software modules, Mobile Apps., equipment's, systems and sub-systems of the project and putting them into successful technical & commercial operation. The scope shall include but not limited to the requirements given elsewhere in the specification.

The bidder shall be responsible to provide all necessary testing and commissioning personnel, tools/ kits, test equipment etc.

J. WORK PLAN:

Key activities in implementation of the project are listed below:

1 Issue of Letter of Intent (LoI) = T
2 All the functionalities and integration with external / internal IT systems specified in this tender to be implemented in T+2 months
3 Pilot acceptance of the system will be performed as per conditions specified in **3.1(f)**. Detailed Work Order will be issued subsequent to the pilot Acceptance.
4 Detailed functionality and the entire scope specified in this tender to be implemented in T+2 months
5 Phased roll out of the service to all Sub-Divisions/ Accounting units in BESCOM
6 User Acceptance Testing as per conditions specified in **3.1 (f), (h)** and testing, commissioning and successful operation as per conditions specified in **3.1(i)**.
7 Maintenance of the system for 2+1 years subsequent to User Acceptance and go live after testing, commissioning and successful operation

K. TROUBLESHOOTING :

Whenever problem arises in day to day operation, the SP should troubleshoot the same within 3 hour of the notification of the issue by BESCOM. The levels of issues are as categorized below:

Sl. No.	Issue Name	Time
Category A	Application level bug fixing and troubleshooting / Database related problems	Within 3 hours
Category B	Procedural level changes / enhancement	7 Days
Category C	Architectural level changes	15 Days
Category D	Repair/replacement of all kinds of Hardware	Same day

a**) Category A. Issues:**

Critical issues impacting the routine operation of the software application would be classified as Category A. Some of the common examples of Category A are:

- Issues related to application not working.
- Issues related to application crashing and hanging.
- Issues related to application not responding.
- Issues related to data inconsistency.
- Issues related to data security.
- Failure of application server.

- Failure of database server.
- Wrong data is displayed in user interfaces.
- Frequent start of application on server side.
- Issues related to data inconsistency and wrong data in reports.
- Reports that govern data collection and consolidation.
- Issues related to application security.
- Issue relating to Connectivity
- Interface is not working for several users.
- Authorization failure of users

b) **Category B Issues:**

Procedural issues and enhancements affecting working of the application would be classified as category B. Some of the common examples of Category B are:

- Changes to existing reports / New Reports.
- New interface
- New Authentication.
- Printout not coming properly for certain report formats.
- Application performance issues.
- Module not working as per the specified requirement of BESCOM.
- New Application patches
- Changes to existing business process flows without architectural changes

c**) Category C Issues:**

Architectural issues would be classified as Category C.

Some of the common examples of architectural issues are:

- Issues related to look and feel.
- Issues related to grammatical mistakes in user interface.
- Changes to existing business process flows involving architectural changes.
- New Functional requirements

d) Category D Issues:

- Example: Non/mal-functioning of hardware

- One technical support having complete knowledge on both hardware and application (for software, hardware and allied works) to each Sub-Division

l. DATA MIGRATION SCOPE

Data to be migrated from its existing/ legacy/ manual systems as per requirement. The entire consumer & network database, commercial data base and MBC database etc. of BESCOM shall be migrated in the system. Data to be migrated will be cleansed, rationalized, transformed (if required) and reconciled. The Migration / Conversion programs shall be written by the Service Provider to handle this task successfully for smooth and accurate data transfer including balances and deposits. The SP to share data migration plan to BESCOM. The existing data in the required format shall be arranged by the BESCOM from the existing service provider for the successful migration of the data.

The following is the indicated list of the type of data to be migrated from the existing/ legacy/ manual system.

i. All Master Data – Must be migrated
ii. All Open Transactions – Must be migrated
iii. All transactions in the current financial year – Must be migrated
iv. Historical Transactions – Number of years shall be decided by purchaser however at least 5 years historical data to be migrated.

m. INTEGRATION SCOPE

All required external systems (like ERP, Smart Metering, DT/ Feeder Metering, Pre- paid metering, Net-metering/Gross Metering, Open Access, SMS Gateways, email Gateways, various payment Gateways, Urja Mitra App, etc. shall be integrated on a continuous basis using an integration middleware layer. The scope of integration of external systems includes IT systems already existing and functional internal to the BESCOM and any other / new IT initiative taken by BESCOM. The integration is expected to be on-line real time or batch where appropriate and shall operate in an automated fashion without manual intervention. Data to be integrated must be validated by the developed interfaces. The data to be integrated will be mapped, transformed (if required) and reconciled automatically. All interfaces are to be self-checking so that any exceptions or data validation errors are reported by the system. In addition, integration logs should be maintained that confirm the success or otherwise of the interface, complete with control totals. All the application modules must be integrated to each other and must be available on both the Web based system as well as Android OS based Mobile App system.

The system should be capable of integrating with the following applications / features and also capable to integrate with any other existing or new future applications / features as and when required by BESCOM and Service Provider shall develop and integrate such applications / features without any additional cost implication to BESCOM.

a) BESCOM Mithra Mobile App
b) KPTCL
c) Electrical inspectorate
d) Karnataka Udyoga Mithra
e) Seva Sindhu
f) Integration with Third Party Payment Agencies
g) AMR HT Billing integration with Analogics / Any other Agencies
h) E-sign & Digilocker
i) Sakala Services
j) Integration of Amrutha Jyothi Scheme to Suvidha Portal
k) HT Online New Connection Process integrated with KPTCL CEIG
l) Fast Track/ Regular LT Online New Connection Process
m) Fast Track/Regular Name change Process
n) Fast Track/Regular Tariff change Process
o) Fast Track/Regular Load change Process
p) Provision to enter Caste Details, Aadhar capture, Ration card capture, Phone & Email ID Capture, Meter type capture provisions provided in Spot billing machine
q) DELP: CFL Bulb EMI Billing
r) Revised ECS 306 Format
s) Government Order on Covid-19 Relief Packages.
t) KERC's Financial Frame Work Model (FFM)
u) Net / Gross Metering Solar Roof Top Billing
v) Implementation of 75 units of free electricity to all SC/ST-BPL Consumers under Amrutha Jyothi Scheme etc.,

n. Modification / Upgradation / New Creation:

The SP shall provide the following services at free of cost;

i. Modify application software whenever there is a change in business process, directives from KERC/CERC, GOK, GOI and any statutory requirement.

ii. Modify software components as and when required.

iii. Up-grade software/ Metadata when there is a change in Tariff structure etc.

iv. If any new technology comes up or a new functionality/logic

needs to be implemented or a modification to the existing functionality / logic needs to be effected and BESCOM wants to implement such changes, then the SP should be able to deploy it at no extra cost

3.2 System functionalities

SN	Feature	Functionality
	Modular Design	Applications, systems and infrastructure are to be characterized as service-oriented, component-based & reusable. The system will be modular in design, operations and implementation.
	System Architecture	The supplier is to balance the adoption of standards used by market leading vendors and products, and adherence to industry standards and open architectures. Systems are to be acquired, developed, or enhanced in such a way that business processes; application and infrastructure services and data can be shared and integrated across the BESCOM and with potential business partners.
	Application Architecture	Application architectures must be highly granular and loosely coupled. This is focused on loosely coupling systems compliant to Service Oriented Architecture to facilitate application recovery. This is to ensure that the failure of one component does not cascade to others. A tier can also be scaled to run separate applications to optimize performance.
	Web based as well as Mobile Android OS design	All the application designed for this purpose shall be web based as well as Android based Smart Devices (SBD) and the Purchaser shall be able to access at Workstations and Mobile Devices through the latest available version of the web browser such as Internet Explorer, Fire Fox etc. at workstation as well as android platform. Any add-on required must be integrated with latest version released by the developer at the time of Bid opening
	Business Process Requirement	Application requirements will be based on BESCOM business processes and the functional requirements that derive from them. The application system should empower the Business Users in defining the business processes by process modelling.
	Data base Server	The applications must be capable of running in a

		clustered environment as high availability configuration of database server that can run multiple workloads.
	Basic system Architecture and Unified Access framework	The applications system should be built using open industry standards of Web & Android services and should have the unified access framework compliant to latest specifications for people, process and information by integrating the backend applications with single sign-on feature, role based, request based and hybrid user type access, searching and collaborative environment.
	Directory Service	Common enterprise wide directory services shall be leveraged by all access systems and services used by all the enterprise users and adhere to commonly accepted standards.
	Message based interface	As per the requirement, Interfaces between separate systems (both internal and external systems) will be messaged based compliant to latest standards.
10	Application Integration	Integration technologies must be industry proven standards. They must be scalable in capacity and provide for extensive functionality.
11	Data Storage	Primary Data shall be stored at data Centre/servers provided by the service provider as part of the contract, however Service Provider shall also facilitate to store a secondary copy of the data at BESCOM data centre if required. Necessary servers/storage equipment will be provided by BESCOM at its data centre for secondary/backup purpose only.
12	Data access	The applications will access data through business rules i.e. the applications must not access data directly without going through APIs managed by business rules/ validation/workflow. Data should be collected once and used many times.
13	Central data Storage	Data shall be stored at central data center.
14	Network environment	The application should be capable in running in a hybrid network Connectivity environment i.e. Dialup, PSTN, GPRS, Wireless, Leased Line, Web & WAN environment etc. including MPLS/VPN SD-WAN based secured tunnel.
15	Application scalability	The application portfolio and the IT infrastructure are to be vertically and horizontally scalable in size, on demand

		with virtualization capacity, and functionality to meet changing business and technical requirements, thereby enabling BESCOM to be adaptable to change.
16	Application manageability	Applications need to be designed for manageability using Enterprise Management System. This needs to encompass: scheduling, backup and recovery, application, database and network infrastructure monitoring, tuning and remote diagnostic management.
17	Network Open	The network will use standard, open, vendor neutral communication protocols. Considering the scale of implementation envisaged, the system will provide for various networking options between different entities. Such options would include Leased Lines, VSAT Links, Telephone Modems, through Internet , VPN, SD- WAN, GPRS etc.
18	Central Administration	It will be possible to set various options and logic of the system (for example -Calculation Logic of payable amount by consumer) centrally. This will ease the system administration work.
19	Data Ownership	Irrespective of the Operation/ Outsourcing option adopted for operation of the system, the ownership/ physical possession of the data will always remain with the BESCOM. The application should provide the flexibility of system disintegration/aggregation of information and application in case of outsourcing, acquisition, and merger of Discoms.
20	Login wise rights, groups	The system will be able to grant specific access rights to each login or group of logins, as per the business requirement and policy of the DISCOMs with unique identify across the enterprise system. System shall also permit temporary transfer of access rights within his group to officers for employees reporting to him.
21	Data Backup	System will be required to maintain daily backups of the database on Reliable backup media.
22	Data Archiving	The System will maintain only five years of operations data online. Operations data more than five years old would be archived and the archives maintained at the various locations.
23	Interface with other system	As per the requirement, system will exist in conjunction with Several other systems. It would therefore be required to interface with other systems for seamless flow of business information.

24	Embedded control	To make the operations more efficient, the system will have the facility of incorporating embedded controls, which would force the organization to carry required tasks in the time frame specified.
25	Report Generation tools	The system will provide a report generating tool, which can be used to generate customized reports at any level. The reports generated should be stored in various user configurable “bins”. The access to bins should be configurable by having security roles in the system.
26	Mail interface	The system will have the capability to interface with the mailing system to deliver the Alerts and Service Orders. The system should also be capable of interfacing with other applications.
27	Prioritizing workflow	The system will have in built priorities defined, which will be used to process the prioritized tasks first in case of system constraints (e.g. network unavailability, time constraints etc.).
28	Performance monitoring of system	The system should have provision for network, application, and database monitoring for performance management, tuning, remote control configuration management features with facility for SLA report generation.
29	MIS Reports	The system should allow for a graphical interface to view the summary data in MIS reports. This would include trend graphs, graphs indicating how much of the target has been met etc.
30	Multiple OS support/ Interoperability.	Client End : The solution should be able to support a variety of client end Operating systems like Windows, Linux with x-windows or MAC OS, Android OS, iOS. Server End: The solution should be built on open standards and interoperable platform and shall be able to interoperate with multiple operating systems.
31	Multiple database support	The solution should be able to interoperate with multiple industry standard RDBMS platforms.
32	Dynamic Workflow Engine	The system should have provision to define and configure workflow for various business process by the administrator to meet the workflow requirements of the BESCOM.

3.3 Functionality of various Application Software Module are as follows :

3.3.1 Billing

Objective: A comprehensive smart billing system will ensure that BESCOM

efficiently bill their customers for the services rendered. It should support the continuous billing to reduce the outstanding. Ensure the timely and accurate billing. The system will support the complaints handling functionally by providing short turnaround times for billing related customer queries.

System Boundary: From: Accepting Consumption data To: Providing reminder letters/ emails/ SMS

System Functionality: This system should broadly cover functions relating to generation, printing and issue of bills to the consumers. Specifications for various billing types, tracking of reasons for deviations from normal billing, billing logic flexibility etc. are some of the features that the system should address.

The proposed system shall be developed for “Monthly Billing”, as per discretion of BESCOM. The system should be capable to generate bills with required flexibility of duration. However, it shall be governed by the requirement of BESCOM or directives of KERC, without any extra cost during the entire contract period.

Requirement ID	Functionality	Description
B1.	Unique Bill No	All bills generated by the system should be given a unique number
B2.	Format of bill number	The logic for defining the bill number would be flexible and provided by the client. For example the system should be capable of generating bill numbers that are reflective of the Section Office, Subdivision, Division etc that the customer falls under. It should also capture the customer category and the billing month.
B3.	Bill Calculation -Billing Logic flexibility	BESCOM would provide the billing logic for generation of bills. This calculation logic will be flexible and BESCOM should be able to revise the billing logic from time to time depending upon the modifications in regulations, tariffs, etc. It should be possible to make these changes from a central location. It should be possible to manually modify the billing logic on a case to case basis, with alerts and within specified limits. The system should follow the same for computing the final bill amount and should generate bill in soft and hard forms for the all type of requisite customers with certain pre-defined periodicity. The system should have the flexibility of defining the periodicity in bill

		processing. The system should have the capability to generate the bills either in batches or individually. System should be capable of generating bills for kWh based tariff, kWh, kVAh, MDI based tariff or Time of Day (ToD or Time of Use (ToU) tariff structure or any other tariff structure as per KERC guidelines/ directives for Tariff of supply for Discom updated/ amended/ changed time to time. System should also accept billing logic for consumer purchased meters. Suitable rebate as per rule be provided for consumer purchased meters. System should have provision of Auto-credit of penalty specified by KERC for BESCOM min case of deficiency of service to the consumer Putting a certain bill amount under deferral due to stay order from court till the matter is decided.
B4.	Transfer in billing logic	System should also support prepaid/ smart. Net metering and billing system and should permit seamless transfer of existing customers from – (i) post-paid to prepaid/Smart Metering/ Net-metering regime and back (ii) Unmetered to metered regime kWh based billing to kWh & kVArh/ kVAh/ Max. Demand based billing/ ToD/ ToU regime and back
B5.	Meter data validation	The system shall be capable of identifying meter tampering data as per BESCOM defined criteria and generate flags for operator intimation and further investigation. The billing system shall be capable of identifying faulty meters and preparation of bills considering a defined algorithm for estimation of consumption during such periods of meter faults. The bills shall indicate the estimated consumption separately. System shall also incorporate multiple meter changes in a single billing cycle, properly accounting old meter final consumption based on final reading (or assessment if functional reading is not available)
B6.	Bar code/ QR	System should be capable of automatic generation of bar code/ QR Code and printing on the consumer's bill Using Universal

	code generation	standard; capable of generating Alphanumeric and all the special characters available on 'Microsoft- Word', Additional Capability to generate output in 'local language' script will be preferred.
B7.	Billing logic downloa d	System should be capable to download the billing logic to SBD to facilitate spot billing at consumer premises using SBD as and when required.
B8.	Bill printing based on dispatch sequence	System must be able to automatically select and print those bills together in a desirable sequence for ease of distribution, which are under same reading cycle/group, convenient for walking order of meter readers/bill distributors
B9.	Group billing	System should allow for generation of common bill for a set of consumers with same due date. The system should also have provision for generation of bill of multiple premises on a single bill for a single customer, if the customer has opted for the same.
B10.	Bill printing flexibilit y	System must support bill processing and printing either at workstation location or at the base billing center.
B11.	Use of preprinted stationary	System must be able to print the bills as well as other requisite reports either on pre-printed stationary or plain paper in Kannada / English as per directions Of BESCOM.
B12.	Interfacing with manual billing	The system should have the flexibility of capturing inputs manually to update the customer database on bills that have been manually generated, with a reason for the same. Such updates should be limited to specific logins.
B13.	Bill on demand	The system should be capable of generating bills on demand by the customers. The system should have the provision of generating duplicate bills on demand from the customer - and have the provision for accepting payment details for the same. The system shall have provision to print duplicate bill of any past bill up to last 5 years (applicable after the software is rolled out)
		The system should have provision for Bill

B14.	Bill correction/ amendment provisions	correction/amendment manually to update/ modify the customer billing database, with a reason for the same. Such bill amendments should be limited to specific logins. The system shall employ separate accounting process for bill amendments, which results in reversal of sales (Unit and Rs.) booked (bill raised) in past financial years, i.e. prior to start of current year.
B15.	Change of billing cycle	The system will have the capability to change billing cycle of a consumer. The changes would include - shifting to another cycle and increasing or decreasing the frequency of billing.
B16.	Interfacing with special drives	If there is some special scheme for payments, then the system will generate the bills taking into account the special scheme provisions. Also, there would be codes for all the Schemes, so that the system can track their usage. There would be codes for all the Schemes so that the system can track their usage. The system will keep a record, as to who authorized the scheme and capture the details of the scheme.
B17.	Options for level payments	System should have options for level payments where in the customer can pay a fixed amount per month. In such a scheme, system should also provide for balancing the charges at the end of the year for any variations between the calculated amount (Fixed amount) Vs the actual charges the customer has incurred.
B18.	Penal Billing for unauthorized use of electricity	System should have provision to compute penal billing for unauthorized use of electricity, as per Electricity Act, and based on parameters defined by KERC Assessment based on sanctioned load / connected load/MDI Assessment based on error in meter accuracy due to tampering Penal tariff for theft /misuse.
B19.	Linking consumer to appropriate tariff	The system should link the customer to the rate applicable to his category. The rate applicable is calculated on the basis of fixed charges, consumed energy, capacity (power consumption limit), taxes applicable, subsidy or support from the government, etc. System shall also have provision to account for retrospective change in tariff/ discount/ subsidy/ Amnesty scheme etc. announced by Govt. with effect from back date. In case of subsidized customer the system should

		calculate amount of subsidy payable against each bill and if BESCOM want the subsidy amount can be printed on the bill for information of customer
B20.	Inclusion of past dues and surcharge	The system should calculate other dues for the customer (e.g. late payment charge, electricity duty surcharge, assessed amount, etc.) and add them to the regular bill amount. If there are past dues, the system should calculate both the past dues and the fines on past dues as applicable. The system should allow flexibility to define and modify the logic for fine/ penalty calculation for different types of arrears as per the prevailing norms of BESCOM. If past dues are there the generated bill should include past dues. In case of any post facto extension of due date, system to have provisions to automatically waive late payment surcharge.
B21.	Management of Security Deposit (SD):	The system should have provision of Managing Security Deposit (SD) like: i.) Auto-debit of incremental SD in bill(s), eg, in case of load enhancement ii.) Refund of SD by adjustment in final Bill iii.) Interest payout on SD through auto-debit in bills or lump sum payout separately iv.) Adjustment of SD in prepaid charges for any consumer shifting from post-paid to prepaid regime
B22.	Billing with pre-payment credit	If there is any credit on account of prepayment, adjustment etc., the system should be able to adjust the credit against the amount payable for the month and generate a zero or a negative bill.
B23.	Estimate billing	As and when the metering data is validated in the system, it should be capable to generate bill under the normal billing cycle. In case of meter data is not available the system should generate an estimate bill based on the past consumption pattern of the customer. It shall also be possible to generate Estimate Bill for theft/ enforcement cases. The system should also provide for change in the estimation logic that may happen from time to time. The system should incorporate the estimate for consumption from the metering module.

B24.	Reasons for estimate billing	The system will have a list of all standard reasons for estimate billing. The list will be compiled based upon BESCOM and KERC guidelines, which may change from time to time. The system should be capable of generating bills for all instances of exceptional readings. The scenarios under which exceptional readings are taken are temporary connections, voluntary termination, forced termination etc. The system will allow the bill amount to be modified by the designate authorities through their login ids only. All such changes along with the corresponding login ids will be tracked by the system.
B25.	Electronic dispatch of bill/availability of Bills on internet portals/ SBD.	The system should be capable to dispatch the generated bill electronically to customer/payment portals to which customer is registered if desired by customer. The bill in actual format must also be available on the BESCOM internet portal/ Mobile App for customers. System must be able to inform customer regarding new bill along with due date & amount via SMS/ email/ notifications automatically. The system should allow generation of reminder letters at predefined intervals before the due date - over the web/ mobile phones/ paper formats.
B26.	Discontinuing billing after dismantling	The system should have the provision of stopping the generation of bills and taking the arrears as bad debts, after a Purchaser specified period of time, say 6-12 months after dismantlement.
B27.	Billing for temporary connections.	The system should have the provision of preparation of Temporary Connection Energy Bill, with DISCOM defined Category and Charges. Provision for - Final Bill Proportion Fixed amount calculation (In case of first bill) Amount Shifted to next bill (if next bill is prepared in same month) Debit/Credit Adjustment (Unit or Amount) The system should have provision for automatic job creation for disconnection and final billing of temporary connections one day prior to the expiry of the duration for which the temporary connection was granted. The system should also have option to extend such temporary connections based

		on BESCOM defined authorization
B28.	Creation of monthly ledger	The system should provide the monthly ledger of the assessment and realization.
B29.	Ledger adjustment	The system should have the provision for Debit/Credit Adjustment in ledger.
B30.	Final reconciliation	The system should have the provision for Final Bill Reconciliation, in case of permanent disconnection and provision for final amount adjustment.
B31.	Monthly report generation	Module can close Ledger monthly and generate assessment And realization report.
B32.	Last bill generation	In case a customer requests for termination of connection, the system should accept the terminating meter reading (which will be out of cycle in most cases) for generating the last bill.
B33.	Provision for holding bill printing till checked	System should have the provision of not allowing to print any bill of a cycle unless cleared by bill quality check group. System shall have post billing filters to out sort abnormal bills based on logic, so that such bills are not printed/ sent to consumer by any mode.
B34.	Bill distribution route plan generation	The system should have provision to generate optimal bill distributor route plan based on bill distribution jobs in a given area in a given cycle.
B35.	Enforcement and Legal Module : Logging of leads	System shall have provision to log leads of theft / misuse by: Creating automatic leads based on consumption analysis and tamper analysis Accepting lead through mail, website, phone calls, call centre or any other mode Capturing the details of the lead contributor person, whether employee/outsider
B36.	Enforcement and Legal Module : Lead processing	The system shall have provision of lead processing - workflow and life cycle tracking for : - Assessment billing - Public Hearing and bill revision - Payment and Settlement - Escalation & Legal proceedings - Recovery of installments - Case closure

B37.	Spot Billing System	
B37.1	Downloading of data in spot billing system	The Spot Billing system shall enable meter reading activities by transferring relevant consumer information data base from Billing system, like service numbers, address, area code, meter number, phase, load, MF, old meter reading, old status, category, arrears if any etc.
B37.2	Uploading of data in spot billing system	At the end of data collection and billing operation in the field, the information recorded in the spot billing machine should be uploaded into the Base Billing system for updating master database in the system. The information would contain the service number, present meter reading, present status of the meter, billed date and time, units consumed, average units, billed amount, due date, disconnection date etc.
B37.3	Billing logic in spot billing system	The Spot Billing software to be resident in the SBD shall be based on the existing billing logic and algorithms of BESCOM.
B37.4	Tariff revision cases	The SBD should be able to calculate the tariff rates accordingly with the previous and present rates during the assessment period, so as to issue the on date calculated demand to consumers under tariff revision period including number of days, slab rates etc.
B37.5	Skipping of meter reading entry	The SBD should prompt for entry of present meter reading. If meter reading is skipped, average/units consumed for previous month from the master shall be calculated/ retrieved and units for billing shall be displayed.
B37.6	Entry of meter status	The SBD should prompt for entry of meter status and display of calculated units/Avg. Units (Avg. units is to be retrieved from the master data) depending upon the meter status.
B37.7	Billing with charges / adjustments	The SBD shall prompt for any other adjustments/ charges depending on the category of the consumer. Net bill is to be calculated after adjustment of above charges and should be displayed and prompt For printout shall be given.

B37.8	Error checking	Extensive error checking shall be provided to assure data integrity during communications between the SBD and the PC.
B37.9	Validation of meter reading data	Field validation for meter reading shall be ensured if the readings are beyond a predefined range and software will have provisions to enter remarks in such cases of abnormality.
B37.10	Printing of summary report	Spot Billing system would print the summary report with SBD serial number, which contains the consumer file downloaded to the unit, total number of services, services billed / unbilled, total amount etc.
B37.11	Password protection	SBD shall have two levels of Password Protection - Supervisory level for functions of upload, download, time setting and other supervisory functions and Meter Reader level for starting and closing the meter reading.
B37.12	Event logging	All events should be recorded in the event file in SBD. The event details should be downloadable for analysis.
B37.13	Menu driven modular format	The spot billing software shall be user friendly, menu driven, structured and modular format for flexibility (Easy changes /Upgradation etc.)
B37.14	Time stamping of Logged data	Data Logging in the spot billing machine shall be date and time stamped.
B37.15	Provision for enhancing the functionality	There should be a provision for enhancing the functionality of the software by adding additional features.
B37.16	Time setting of SBD	The SBD shall have the facility to get its time set from Billing system only with proper security and password authentication.

In addition to above functionalities, the system shall also have the following features/ functionalities:

3.3.1.1 Billing System

i. Bills shall be generated in the prescribed format as per the requirement of the BESCOM, thermal bill shall be 10” length and 3” width. Bills shall be generated and issued to customers by BESCOM Meter readers or GVP’s or BESCOM outsourced Meter readers using spot billing devices (SBD) at the customer premises for all Metered categories of installations. The pre-billing and post billing data should be downloaded/ uploaded to the server on real-time.

ii. Provision shall be available to update the assessed consumption to the un- metered installation both individual and bulk consumers as per the tariff order in force and generate and print the bills at system side by the users.

iii. Reading entry shall be either manual or downloading through optical port or downloading through OCR technology or scanning using RFID (with zero dropouts) technology. The Devices shall support all the above said options. Required interface cables shall be provided along with the devices. Furthermore, if any new technology comes up and BESCOM wants to implement, then the SP should be able to deploy it at no extra cost.

iv. Provision shall also be available for mass bill generation for HT, 40HP & above or any other category in the system apart from generation of bill through SBD. The mass bill generation shall be either MR wise/ MR wise & day wise/ Section wise/ Section wise & day wise/ SDO wise / SDO wise & Day wise/ etc., up to company level.

v. SMS / notification to consumers once the Meter Reader starts his meter reading operations in his designated area.

vi. SMS / notification to the consumers for the billing amount in the Bill generated for continuous 3 days before due date of the bill.

vii. SMS / notification to consumers whose meter could not be read by the Meter Inspector for No Access.

viii. SMS / notification to consumers with reading details after the reading is captured.

ix. Bill processing in centralized bill server for LT and HT consumers.

x. Auto and manual entry of sundries

xi. Auto and manual entry of meter updates

xii. Additional SD instalment bill/ including generation of notices of enhance security as per BESCOM of LT/HT consumers

xiii. Processing of Bank Guarantee & Letter of Credit for HT consumers.

xiv. Consumer History View at least last 5 years, Meter History View, Export & import of Consumers from one location to another location.

xv. Feature should be there for creation of new SDO/Division/Circle and transfer of consumers from one SDO to other without effecting field activity without any additional cost to Discom.

xvi. Feature should be there for merger and split of Sub-Divisions/Sections without any additional cost to Discom.

xvii. The agency will generate the MIS/Output reports/others etc. of BESCOM integrating data of the agency and data of R-APDRP.

xviii. The agency shall design a solution such that the stored images should get fully rendered within 5 seconds on any client machine.

xix. Secure import of meter readings & billing parameters into the

system from third party systems. Provision to upload billing parameters from CMRI/MRI etc., directly into the system, both in batch and single read modes. System shall have provisions to e-mail the bills in ".pdf" format to the consumers.

xx. Bills should generate after duly considering the imports and exports of energy (wind power, IEX, Open Access, Solar Power, Captive Generation, DER etc.), changes of meters, change of CT/PT, TOD Slabs as per tariff and business rules.

xxi. High Value Consumer bills are to be printed on large format (A4 plus).

xxii. Bills to LIP & Government consumers are to be provided in 4 copies for each consumer.

xxiii. Security deposit to be auto adjusted.

xxiv. System for informing non-usage of electricity during a certain period of time due to absence from premises.

xxv. SD refund tracker

xxvi. Viewing of meter information, consumption history and SD details

xxvii. Energy calculator

xxviii. Power consumption guide

xxix. Reporting disruption of supply

xxx. Reporting power theft

xxxi. Request for bill tariff change

3.3.1.2 Tariff & billing rule management

a) The software shall provide a UI based interface for configuring tariff and business rules.
b) The software shall have provisions for retrospective and prospective billing.
c) The software shall have provision to calculate part bills with variable bill period.
d) The software shall have a flexible, user configurable tariff , Revenue Manual and business rule management interface and almost all the changes can be configured without changing at the code level.

3.3.1.3 Spot Billing Software/System

a) The Web Based Software shall have provision to create, update and modify route traversal plans as per the billing schedules. The primary route traversal plans shall be 11kV FEEDER WISE.
b) Spot billing software shall facilitate communication with the central server using standard mobile network (3G/4G or better with fall back support upto 2G)).
c) The Spot billing software on the SBD shall facilitate local storing of the data and based on the availability of connectivity the mobile data shall transfer the same to the central server.
d) Automated data downloads with or without user intervention i.e. the pre-billing data as per the route plans shall be automatically downloaded to the SBD.

e) The SBD software shall be auto updated from central server for tariff, data validation and other billing rules

f) The SBD shall be capable of generating bills both in online and offline mode. In offline mode, the bills shall be queued for updating to the central server and shall be updated once network is available in background.

g) The device software shall have options to capture the photo of the dial of the meter. Option to capture multiple photos to depict any abnormality shall also be provisioned.

h) The device software shall have capabilities to record the GPS co-ordinates. The software should display the location accuracy for more accurate GPS capturing.

i) The device software shall have capabilities Biometric Authentication for login and other activities like collection and billing to be configurable from server end.

j) The Software on the SBD shall be able to print the bill using the integrated 3inch printer.

k) The system shall have provision for Spot Cash Collection module with configuration option.

l) Provision to load any other software shall be available and the same shall be developed and loaded as per the requirements of Discom.

m) The SBD software shall have provisions to capture any other additional information like consumer mobile no, meter detail, observations etc.

n) SBD software shall have provision to generate various reports as defined by Discom from time to time.

o) SBD software shall have features to download the DC notices from Central Server.

p) SBD provided for billing shall be secured i.e. Upon power on the smart Device shall directly launch only the authorized apps of the DISCOM and all other feature of the SBD that are not used for DISCOM purpose shall not be enabled/available to the user.

q) The data stored in the SBD shall be secured with encryption and shall be tamper proof.

r) Automated Spot Bill generation by direct downloading of meter data to the SBD from communicable meters. The software shall facilitate downloading of billing parameters or the complete meter data or any desired parameters as specified by BESCOM from time to time. The SBD shall automatically generate the spot bill without manual punching/feeding of billing parameters.

s) The required Devices/Communication cables & accessories for establishing the connectivity between the meter with Optical ports and the SBD shall be provided by the bidder one set for every SBD.

t) The meter data downloaded other than billing parameters shall be uploaded into the server software for further analysis.

u) Bidder has to diligently examine and consider all the components required for enabling direct download of meter data from different makes/types of meters for automated spot bill generation.

v) System shall be capable to store Meter change, New Connection and

any other changes of infra at consumer end and malpractices, anomalies in consumer premises / meter.

w) The SBD shall have provision of upload the photo of meter and its display to the central server.

x) The interface application software for the spot billing device shall be developed by the successful bidder **as per the prevailing KERC Tariff structure & Government Tax Structures in force** and bills shall be generated in the prescribed format [**Annexure-I**- Spot bill format]. Formats are subjected to change as per the requirement of BESCOM. Bills shall be generated and issued to customers by BESCOM Meter readers or GVP's or BESCOM outsourced Meter Readers using spot billing devices at the customer premises for all Metered categories of installations. The pre-billing and post billing data should be downloaded/ uploaded to the server on real-time basis and Offline in case of exigencies.

y) SBD should support manual reading, Auto download of reading from the meter through optical port or OCR Technology*, Auto capture of reading from RF and IR Technology enabled /Built – in RF Module & Built-in Irda Module meters without any additional cost to BESCOM. During billing, the system should logically identify the meter with meter serial number and it should be able to capture meter time stamp, Max Load, KWH, KVAH and power factor, etc which will be used during the billing. For Optical Port reading, required interface cables shall be provided along with the devices.

*Optical character recognition (OCR) is a process that translates scanned or printed image documents into a text format. Once the image is scanned, it can be converted into an ASCII or Unicode format so it can be used as text. A typical OCR program performs several techniques to extract text with some pre-processing and post-processing techniques, along with few optimizations to increase the accuracy. The main focus is to deploy an OCR program combined with an application which can extract readings from electricity meters and convert them to machine readable code and issue electricity bills to the consumers at the spot. The SBD devices should have inbuilt Optical Character Recognition technology and able to capture meter time stamp, Max Load, KWH, KVAH and power factor, etc which will be used during the billing and capable of generating the accurate energy bills using this technology.

z) Further the system should support to install and operate any apps of BESCOM at no extra cost.

aa) The Service provider shall provide One SBD along with connecting cable [SBD SET] for every 2400 live installations Plus 10 % spare SBD SET on the Total Quantity to be supplied. Spare devices shall be given to the custody of Sub-Divisional Officer. These SBD sets shall have the warranty period of 3-Years. The same shall be replaced with brand new devices of same specification or advanced technology SBD for the extension period if BESCOM desires to extend the same beyond 3-years at no extra Cost. Additional SBDs shall be provided for increase of every 2400 installations per SDO of BMAZ/ Other Zones respectively to the concerned SDOs.

bb) All the consumables of the SBDs such as Battery, Printer etc.,

are included in the scope of the contract and successful agency shall replace these consumables as and when required without any additional cost to BESCOM

3.3.1.4 Android OS Based Integrated Spot billing Device Management System

SBD management module shall facilitate the management, administration, adding, removing, user management of SBD. In addition, the software shall have graphical user interface where the following features shall be available:

a) To view the live status of device based on location, meter reader, sub division, division, circle, zone, DISCOM etc.
b) Group and view the devices based on Meter Readers, Sub Divisions etc.
c) The device view shall show the live details of the device indicating the operational hours, signal strength, battery status, last bill issued GPS location etc.
d) Sub Divisional officers shall be able to trace the meter readers and monitor progress on Google map.
e) The Software shall have the facility to monitor the key parameters like battery, network, data usages.
f) The software shall monitor the version of the software that is currently in the device and check for update, tariff and rule changes and update the same to the device.
g) The software module shall have facility to trace the device life cycle.
h) Any other feature that would increase the meter reading monitoring shall be made available as per Discom requirements from time to time.

3.3.2 Collections

Objective : The system should provide different payment and information channels to customers and own staff to improve customer convenience for payments and enable collections for the energy billed, and a shorter metering-bill billing-collections (MBC) trade cycle

System Boundary: From: Capturing payment details To: Generation of disconnection and dismantlement lists

Requirement ID	Functionality	Description
C1	Decentralized payment processing &centralized reconciliation	System must be capable of handling centralized or decentralized payment processing. And System must be capable of centralized reconciliation of the collection.
		The system should capture all the customer and payment details as specified by BESCOM

C2	Linking payment To logging id	time to time. All payments should be associated with the login-id of the personal receiving them and the collection center codes at which they were received. All collections should be made against specific bills/ forms to enable reconciliation at a later stage.
C3	Mandatory reason code	In all Instances of collections without bill/ form the system should make it mandatory for the user to specify a reason from the predefined reason codes embedded in the system, and defined by BESCOM from time to time.
C4	Code based Classification of collection	All collections will be classified against standard codes of payments that would be specified by BESCOM from time to time.
C5	Receipt generation	The system should generate a receipt whenever money is collected. Each receipt should have a unique receipt number. The system will allow payments to be collected under the payment categories indicated by BESCOM.
C6	Adaptability to different mode of collection	System shall be capable to receive payments made by the consumer in either of the following modes: - Cash/ Cheque/ Bank Draft/ Credit Cards/ Debit Cards/ Internet Payment Gateway/ Mobile Apps/ wallets or Payment made by direct debit from bank accounts on authorization by the consumer (ECS). Any other mode as may be specified by BESCOM from time to time. In certain cases (e.g. Advance Payments) collections can be accepted without the bill as well. System should have support of accepting payment through a single cheque against multiple bills and keep proper track against respective bills. Further, the system shall also allow the consumer to pay one single bill
		through multiple modes i.e. through multiple cheques of different banks, by cash & cheque etc. The payments made by the consumers are to be acknowledged and accounted for in the respective databases. For payment made by the consumers at Collection Counter through Cheque/ Bank Draft computerized acknowledgement shall be issued to the consumers. System must be able to generate

		& send SMS/ email/ notification automatically to customer for every payment received.
C7	Handling of cheque payments	The system should have following functionalities: a) Holding recovery proceedings based on cheque submission, but recognition of payment on cheque clearance only. b) In case of cheque dishonor- i. Reversal of any payment recognized by the system ii. Levy of handling charges iii. Generation of Notice under Negotiable Instruments Act iv. Blocking of further payment by cheque till a defined timeframe/logic with appropriate message on bill for same.
C8	Daily reconciliation of cash and bank	The system should generate a daily total for the receipts issued for the day. This would enable the daily reconciliation of the cash collected with the amount entered in the system as 'payment received'. The system should also capture all bank remittance details. At the end of a period, the system should reconcile them With the bank statements.
C9	Acceptance of part/ advance payment	The system should have the flexibility to accept full or advance payments. The system should also have the facility to centrally change these settings from time to time.
C10	Interfacing with Special drives	In certain cases (e.g. during special collection drives, collection by spot billing agent etc.) collections are made in the field and Receipts issued there. The system will have the provision for accepting the collections and receipt details for such field collections.
C11	Generation of reminders/ disconnection notice	The system should allow generation of reminders by SMS/ email/ notification/ letters at specified dates - before the payment due date, and notices for disconnection, dismantlement.
		System shall be capable to cancel receipt at cash counters due to wrong punching etc. The

C12	System ability to keep track of cancelled receipt	details of cancelled receipt to be kept in the system and the same may be printed on the new receipt also. System should also provide to reverse the payment applied to a particular account in case errors are detected at a later stage, e.g. payment getting applied to a wrong customer.

C13	Finance & Accounting	The system should have provision for - i) Automatic creation of books of accounts based on: - Balance Sheet and Profit & Loss Statement as per GAAP and Indian Companies Act1956 - Annual Revenue Requirement, based on Electricity Act 2003 read in conjunction with KERC/ CERC regulations ii) Meter to be treated as asset in ARR (may be treated as consumable material in other books of accounts) Different payment settlement logic for various components of payment received from the consumer: - Energy Revenue (a) Revenue as per tariff: Subsidy/Discount outside normal tariff structure Penal tariff in case of theft /misuse (b) Electricity Tax - Non-energy revenue Charges for various services: Service Tax Late Payment Surcharge (c) Penalty payout to consumer in case of deficiency of service (d) Interest payout to consumer on: Security Deposit Advance Payment - FIFO/LIFO settlement logic specific to the BESCOM requirements, on the following buckets: (a) Arrears: Prior to certain period, inherited by Discom from SEB as legacy After the certain timeline, as accumulated by Discom (b) Current Demand iv) Payment settlement logic should take care of the following scenarios: Part payment Late payment Surplus payment Advance payment Bill amendment after payment of bill

In addition to above functionalities, the system shall also have the following features/ functionalities:

3.3.2.1 Payment Collection

This module shall cover the following functional requirements:

a) Multi-tiered approach to handle operations at all levels
   (i) Cashiers & Supervisors at the Cash Offices
   (ii) Controlling Officers at Treasury Department/e-Gras/RTGS/NEFT
   (iii) Senior Management
b) Automatic generation of Cash Book

c) Automatic generation of Lodgment Report
d) Data integration with future ERP system for final accounting
e) Integrates with other downstream ITESs of the company
f) Role based security
g) Extensive MIS to facilitate monitoring and Control
h) Rigorous Data Validation Process to ensure data integrity
i) Deployed Over a High Available Architecture
j) Validation for deposit of cash as per KERC orders
k) Validation for dishonored cheque deposit second time.
l) Facility for periodic reconciliation as defined by BESCOM with the payments imported from other agencies in all aspects including bank reconciliation.

3.3.2.2 Other payment Collection features

a) Payment collection software should have dashboards and MIS reports for monitoring payment collection and reconciliation at various levels.
b) Payment collection module should have transaction based approval before the payments are posted and accounted.
c) System should support group payment facility for acceptance of one single payment for set of consumer accounts. System should generate reconciliation reports for the same.
d) In case of internet is not available at sub division offices or internet is down for specific period of time then the system (spot billing devices and sub-division office) should have provision to work in offline mode.
e) The generation of receipt and printing should be continued and data has to be stored in local system. The system should be capable of holding and population of data on central serves for 24 hrs of operations or in multiple batches based on the need so that the performance of the system should not hamper. On restoration of internet payment details has to be transferred to central server.
f) System should support acceptance of payment by reading the bar code for bills issue through Spot billing device.
g) System should have the flexibility of reversal of payments in case of cheque dishonour. Blocking of further payment by cheque till a defined timeframe.
h) System should have the logic of defining the distribution of the payments against the bills based on the specific order or as defined by BESCOM like Tax, Interest, Revenue etc.
i) System should have the facility of generation of ASD notices.
j) System should support monthly payment reconciliation process.

3.3.3 Metering

Objective: An Effective meter reading system would enhance the

effectiveness of the measurement process. This would include accurate metering for all customers and tapping revenue loss through the identification and handing of exceptions.

System Boundary: From: Consumption detail capturing To: Providing final reading

Requirement ID	Functionality	Explanation
M1	Collecting meter readings in the metering database from remote meters	All the input points to the circle and feeders & related distribution transformers are having electronic meters generally connected with MODEM/ DCU/ MFT etc. The system should able to communicate with server through dial up line or other communication devices (including data transfer through removable media.) The system should also be capable of interfacing with Spot billing devices and MRI data for uploading such meter readings including consumer meter readings (manual reading, Smart meter readings, reading through Modem/ Smart devices). The detail specification of system meter data acquisition is in separate chapter as „datalogger"
M2	Data Validation	System should provide data validation checks to minimize data entry errors. It should incorporate user supplied logics to check variations in consumption and generate exceptions. After data entry, the system should generate an Exception Report for non-reading of meters due to any reason. It shall also highlight possible inconsistencies in the metering data. After handling of exceptions by the respective officials, the system should be updated with the result of exception handling. While validating if the meter reading found low / unacceptable based on earlier readings/trends the system should issue a work order for checking and replacement of meter. If the work orders are not closed with valid reason system should escalate the issue till the same is resolved
M3	Data Review	The system should provide the facility for the designated officials to review the metering data as per BESCOM defined criteria. In case any discrepancy is found, the system will allow the data to be edited, with proper access rights and audit trails.
M4	AMR Compatibility	The system should be able to interface with Automatic online Meter Reading devices. System should be capable to schedule and collect automatically readings from online connected consumer meters/Distribution

		Transformers meters through automatic meter reading system. The system should generate exception in case meter reading found unacceptable after validation check

M5	Capturing Meter reading Data	The system should be capable of capturing meter reading data from a Meter Reading Book, handheld computers / Smart Meters/ Modems/ DCUs/ MFTs/ SBD/ CMRI used for spot metering & billing for uploading and downloading the data. System should be capable to upload and download the data for a given set or group of consumers to CMRI/ HHC automatically. System should also keep log of CMRI Device/ HHC assigned to meter reader.
M6	Validations for the spot metering and billing data updated	The system should be able transfer or update the meter reading validation logic to the MRI and spot billing machines. The system should have the flexibility of validating the data uploaded from the meter reading instruments. The validation would include restricting the customer data uploads to those that were indicated in the meter reader's schedule.
M7	Prohibiting the wrong entry	The system shall also have provision for prompting the Meter Reader at the time of entering wrong meter reading values in the spot billing machine.
M8	Meter reading plan generation	System should generate meter- reading plan for day / week / fortnight by meter readers and provide it to the respective authorities. For generating meter reading plan system should take care of no of meter readers available with the customer and their productivity for coverage of all meters before due date. The business logic shall be provided by owner and owner should have a flexibility to modify the same. After generation of plan the same shall be sent to respective offices by e-mail/other mode, so that the meter reader can download the site/premise addresses of the meters to be read on that day. The system should be capable of- Assigning individual MRIs to individual Readers to track their performance. Generation of optimum route plan using the capabilities of the GIS and based on reading jobs (including re-reads if any) to be read in a given cycle in a given area/route to maximize the productivity of meter readers. Optimization of meter plans whenever a new

		connection is "inserted" in a route, or an existing connection is disconnected and "deleted" from the route. Reading plan should include disconnected connections also based on logic, and should exclude the same based on instruction from authorized user; reader should not be able to know from MRI whether a particular connection on his reading plan is supposed to be live or disconnected, for the purpose of tracing the connections wrongly marked disconnected where meter may still be at site.

M9	Monitoring meter reading plan	The system should make it necessary for the meter readers to upload all the meter readings according to the itinerary generated within the timeframe stipulated by BESCOM. Otherwise exceptions should be generated and further meter reading can be entered only after clearance from specified authority. The system should track and generate the exception reports, for each meter reader to establish performance measures and determine deviations if any. It may include No. of meters planned, no. of meters actually read per day, no. of wrong readings, unread meters by reason etc.
M10	Monitoring Customer exception	The system should be able to track customer behavior in terms of exceptions. For example: The number of times a customer figures in the list of exceptions.
M11	Supporting meter reading on trust	The system should also have the facility if desired by BESCOM to enter the meter reading as specified by the customer by telephone/ fax/ web portal/ Mobile App and record that the same is customer- specified. All customers who provide a reading on trust, should be inspected after BESCOM specified time period. This would mean that a customer providing a reading on trust would be inspected once every 6/12 months for instance.
M12	Overdue alert	In case a meter reading becomes overdue the system would generate the necessary exceptions and alerts.
M13	Accepting change in metering cycle	The system should be in a position to cater to changes in the metering cycle. Metering in certain cases may be TOD, hourly, daily, fortnightly etc.
M14	Capability to store data for a specified period	The system should keep past metering data online for a period specified by BESCOM & KERC guidelines from time to time.
M15	Interfacing with spot billing and MRI instruments	The system will support data downloading to and uploading from SBD used for Spot metering & billing and MRI. The devices would provide information about the meter number, customer code, meter reader's employee no, meter reading with date and

		time stamping, and billing amount.
M16	Meter reading for temporary connections	The System should be capable of accepting opening, closing and intermediate meter readings for temporary connections for generation of bills for such connection.
M17	Final meter reading for closure of connection	For all kinds of disconnections (whether a customer requests for termination of connection or BESCOM disconnects due to non-payment), the system should accept the terminating meter reading (which will be out of cycle in most cases) for generating the last bill.

M18	Lifecycle monitoring and testing plan for meters	System must be capable of capturing complete meter history throughout meter's lifecycle, starting from arrival in stores to type, Make. Model, Batch, Catalogue Number of meter, its place of installation, cycle and record of calibration/testing till it is being scrapped or destroyed. System must be capable of capturing data like ordinary meter, electronic meter etc. System must be able to identify the meters, which are due for mass replacement or scheduled testing/calibrations and generate a work order for action by field staff. It is desirable that system should be able to interact with meter testing devices for obtaining test report.
M19	MIS generation	System should be capable to monitor and track the following : Meter readers performance, Comparison of input versus expected consumption, variance in consumption for consumers etc.
M20	Tracking meter location	Current location of meter must be tracked i.e. in stores, under testing, at consumer premise, under overhauling etc. Data must be captured at appropriate locations and point of time to track the meter.
M21	Tracking meter status	The system will track the current status of the meter. Various options would include Correct Meter, Stuck-Up Meter, Sluggish Meter, Door Lock etc.
M22	Tracking meter/meter boxes Seals	Tracking & reconciliation of meter seals i.e. date, type no. of seals, sealed by condition of meter etc. including meter boxes.

3.3.4 Disconnection, Dismantling & Reconnection

Objective: Recovery improvement and improvement in collection efficiency. The system should aim at improving recovery through a disciplined disconnection and dismantling mechanism that would serve as a deterrent for defaulters. This shall also provide updated information to CRM.

Specification : Disconnection, Dismantling & Details of Revenue related matters.

Requirement ID	Functionality	Description
Dis.1	Generation of defaulting consumer list	System should be capable of generating the list of defaulting consumers i.e. the consumers who do not make payment of their bills by the due date or the date on which list is generated, whichever is later. System should be capable to accept report of action taken on such consumers and remind further action required to be taken during specified period as decided by BESCOM.
		System should have the provision of generating automatically list of disconnection notices as per BESCOM

Dis.2	Generation of disconnection list	defined criteria and defined template. After expiry of due date of disconnection notice, it should print disconnection advise for disconnection by field staff. The defined criteria may : ➢ Exclude cases with open complaints in customer care module ➢ Classify live and disconnected cases in separate buckets ➢ Prioritize cases based on default amount, aging of debt tariff category, category of consumer etc.
Dis.3	Process of dispatching disconnection notices	The system shall have provision of dispatching the disconnection notices to the consumers by post, through email wherever available or any other information channels. E-mails should be sent automatically by the system and printed notices shall be dispatched by BESCOM staff.
Dis.4	Capturing of Non disconnection reasons	The system should capture the reason for non-disconnection from amongst the reasons predefined by BESCOM from time to time. System should also have provisions for maintaining (Adding/ Updating/Deleting) non- disconnection reasons to designated persons.
Dis.5	Creation of exception report on disconnection	The system should recognize payment received on real time basis and shall be able to raise exceptions accordingly, so that the field staff can be informed on payments made after the disconnection list has been generated, to avoid unnecessary trips to the customer premises. System should also have provision for such cases, where the field staff receives the payment (Cash/ Cheque) from the customer while visiting customer premise for disconnection and update the disconnection status or call the designated person to update the same.
Dis.6	Updation of customer status	The system should be able to provide updates on the customer status – disconnected / dismantled / live.

Dis.7	Updation of dismantlement status for deduction from SD on auto	The system should be able to update the dismantlement status, triggering an automatic deduction from the security deposit of the customer.
Dis.8	Linkage with New Connection module	The dismantlement information should be available to the new connection approval process, so that dismantled customers are not provided new connections till the dues have been cleared.
Dis.9	Tracking and escalation of disconnection failures	The system should be able to track reasons for failure of disconnection/dismantlement and escalate the case to a user- defined higher authority.
Dis.10	Generation of optimal route and plan	The system should be able to generate the optimal route and plan for dismantlement, such that the people, transport asset (vehicles) and meters utilization are optimized. The system should be capable of accepting business logic to take care of such optimization.
Dis.11	Termination of connection	In case a customer requests for termination of connection, the system should accept the terminating meter reading (which will be out of cycle in most cases) for generating the last bill.
Dis.12	Integration with MM system	The system should be able to provide information to the materials management function, on the meters that have been rendered available because of dismantlement.
Dis.13	Integration with GIS database	This module shall be integrated with GIS database and updating of GIS database is mandatory in case of dismantling of existing customer.
Dis.14	Exception reports on payment by disconnected consumers	The module shall generate exception, if the disconnected consumers not paying the dues after disconnection within a period specified by BESCOM.
Dis.15	Transfer of dues from one connection to other connection(s)	The system shall have provisions to transfer dues from one connection to other connection(s) including transfer of dues of disconnected connections to other live connections of same owner.

In addition to above functionalities, the system shall also have the following features/ functionalities:

3.3.4.1 Disconnection and Reconnection Management System

a) The web based software shall have work flow based rules for permanent disconnected consumers until they are permanently disconnected and dismantled including the process for adjustment of deposit and preparation of final bill and write-off‟s.
b) The web based software shall have provision to enable record on field disconnection status through hand held devices if desired by the DISCOM.
c) The web based software shall have facility to push the disconnection list and reconnection list to the mobile apps installed on the Smart Devices (Android Based Smart Phone/ Integrated SBM device) for implementing disconnection and reconnection.
d) Mobile app for effecting disconnection and reconnection shall be provided by the bidder.
e) Mobile app user shall have the provision to capture the inspection details at the time of field visit. Complete flow shall be provided for the disconnection and reconnection.
f) The system shall have work flow based module for facilitating the disconnection to permanent disconnection and dismantling by generating all the required notices including the adjustment of deposit etc.

3.3.5 Energy Audit

Objective : Monitor important distribution parameters, capture hierarchical view of energy accounting, Network assets of power distribution utilities, intelligent analysis tools for plugging loop holes and identifying revenue leakage, adding into perform network planning and management activities, calculate / identify technical and commercial losses at any point in the network.

Specification Energy Audit

Requirement ID	Functionality	Description
Ea.1	Collection of energy flow data from metering module	The system must collect energy flow data from the metering module. The manual entry of data should not be allowed except in the exceptional circumstances. The same can be allowed only by system administrator after approval of CEO or persons authorized for this purpose.

Ea.2	Provision of graphical network diagram and network reconfiguration	The module should have a graphical network diagram indicating schematics of each substation, all connected transformers, outgoing feeders, DTs, all switches and connected meters. Based on the input from field, operator should be able to modify the switch position to represent reconfigured network. The time of carrying out such operation shall be informed by field staff. If the SCADA/ RT-DAS/ 11kV RFMS is in place the input for switch position should come from SCADA/ RT-DAS/ 11kV RFMS automatically. From the condition of switches, the system should be able to understand the power flow logic at any given point of time.
Ea.3	Calculation of Bus bar and transformation losses in the sub station	With the help of Integration with System Meter data acquisition module, the system should be able to check energy balance between HV side and LV side of any Sub station to ensure all the meters are working properly and can calculate bus bar losses and transformation losses in the substation.
Ea.4	Calculation of HT losses	The system should be able to balance 11 kV feeder flow against consumption of HT consumers and DTs in the feeder through integration with System Meter data acquisition module, thereby finding HT losses and DT losses.
Ea.5	Calculation of DT losses	The system should be able to add consumptions of all the consumers connected to a particular DT and the consumptions of all the DTs in an 11 kV feeder. The necessary data for this regard will be available from the Customer indexing and asset coding database and billing data base.
Ea.6	Provision of Network reconfiguration in case of change in power flow logic	In case of change in power flow logic due to network reconfiguration the system should be able to regroup the DTs / 11kV Feeders based on changed network configuration. The energy consumption data at the time of network reconfiguration should be recorded by system for energy accounting. In case meters are not recording on line data the consumption data of the meters recorded closest to the reconfiguration time should be taken for

		consideration.
Ea.7	Calculation of allowable technical losses in the system	With the help of Integration with Network Analysis module, the system should have been able to calculate the allowable technical losses in the system from the power flow data and network data available in the system.
Ea.8	Calculation of estimated technical and commercial losses in the system	The system should be able to calculate the estimated technical and commercial losses in every part of the network via integration with Network analysis module, GIS based indexing and asset mapping and computerized Billing System.
Ea.9	Generation of report of energy accounting and graphical analysis	It should store the energy audit data of each month for a period of 5 years. The system should able to generate report of energy accounting indicating areas where high technical losses and high commercial losses are taking place. The system should be able to generate graphical analysis of losses over a period.
Ea.10	Features of intelligent data analysis	The system should have intelligent data analysis feature to detect possible malpractices by comparing previous statistics of consumption.

3.3.6 New Connection

Objective: The proposed system would aim at enhancing the convenience of the customer, when an application for new connection is received. It would enable the customer to collect and submit applications through a host of delivery channels, allow application status tracking etc. The system would help reduce the time taken for the new connection process. The system would enable updating customer data to be captured in the GIS based customer indexing database in a reliable way. The data entered at this stage would form the basis of the customer's record in the system. The system would ensure, through validation and checks, that the integrity of this data is maintained.

System Boundary From : Issue of Application To : New Connection confirmation, Temporary Connection, Load Extension/Reduction, Name Change and Meter Shifting etc.

Specification New Connection

Requirement ID	Functionality	Description

NC1.	Standardized formats and issue of form	The system should be able to generate and issue different application forms for New connection, Temporary connection, Load extension/reduction, Name change, meter shifting etc. for different categories of users, and the same forms should be available across all delivery channels (Section/ division/ circle/ corporate office/ customer service center, over the web/ SBD (Android OS Based Integrated spot billing device) etc).
NC2.	Accepting application form	The system should be able to accept the form over the web & SBD and request the customer to make a payment at the Discoms collection centers before a specified date. The system should also be able to accept forms at customer care center and manual / automatic input (through scanner and OCR software) of customer data from application forms. System should check before accepting a form that all mandatory details as mentioned in the forms are filled.
NC3.	Accepting registration fee details	The system should be able to record the registration fee payment details and issue a receipt to the customer. The payments of registration fees may also be accepted through secure on line payment gateways over the web & SBD using latest version of SSL and in such cases receipt and application no will be displayed on the customer browser and the same will be emailed to customer.
NC4.	Generation of unique application no	The system should generate a unique application number for every application form received and registered.
NC5.	Reconciliation of collection	All registration fee details captured should be reconciled with the collections for the day via integration with MBC system.
NC6.	Accepting customer details	The system should be capable of capturing the details of the customer from the Application form.
		The system should accept the customer details and then check the applicant's particulars against the set of existing

NC7.	Checking customer details	customers, defaulted customers, disconnected and rejected applications. In case of a match in records, an exception should be raised. This exception should be flagged off to the relevant approving authority. After clearance from approving authority, the application will be processed further or the same will be rejected.
NC8.	Handle special drives	The system should, based on a minimum set of data requirements and approvals specified by BESCOM, accept applications fulfilling the new connections or load enhancement need posed by special connection/ regularization drives.

NC9.	Checking system capability for issuing connection	The system should be able to assess the load for each applicant based on the predefined standards and validate the customer's self- assessment of load. The system should also have provision to accept installation test report of Licensed electrical contractor and to consider the load mentioned as the sanctioned load as per KERC regulations. During the verification process, the system shall also validate the current load on the relevant transformer, whether additional capacity is available. This information is maintained in a separate server (GIS based customer index and asset coding data base) The system should be able to provide a list of exceptions where the self-assessment does not match the standard load.
NC10.	Inspection report generation	The system should provide the functionality of generating an intimation letter to the customer informing him of the customer premise inspection. The corresponding section office would also be informed of the premise inspection.
NC11.	Generate Standard	The system should be able to define area-wise standards based on the customer database for the area and a predefined logic. For instance, based on the applicant's locality, category and applicant details (premise floor area). The system should provide the flexibility of modifying the business logic that drives the standards.
NC12.	Waiver of inspection	The system should have the flexibility of bypassing the premise inspection requirements for customer below a particular connected load.
NC13.	Accept inspection report and capture all details	The system should accept the customer load details, the category assigned etc. from the section officer, once the field test has been performed and add these to the customer database. It should also facilitate to capture the information regarding customer’s planning to provide the service line himself etc, so that the development charges can be adjusted to reflect the same.
		The system should be able to prepare an

NC1 4.	Estimate preparation	estimate for new connection, temporary connection, load extension/reduction, shifting of meter and / or service line with details as per BESCOM defined criteria which may change from time to time. The system should be able to estimate the development cost after field inspection and the cost data provided by BESCOM. This database will be modified by BESCOM from time to time. In case of availability of on line stores and materials management module, system should be able to check materials availability and generate exceptions accordingly.
NC1 5.	Updating application status	The system should update the applicant log with his status (Accepted / Rejected / under process).

NC16.	Generating rejection letter	In case the application is rejected, the system should generate a dues settlement statement, and print a cheque for dispatch to the applicant.
NC17.	Generation of unique Service connection no	After approval of the application form for new connection / temporary connection, the system should generate a unique Service Connection Number ("SCN") for the customer. The logic for generating SCN shall be provided by BESCOM. The system may has to interface with GIS based consumer index database for generating SCN. This number would form the basis of all transactions by the customer under his account with the BESCOM. The service connection no. and the entire customer detail shall be first updated in GIS based indexing database before issue of service order for new connection / temporary connection. Similar updation of GIS database shall be done for other cases like load extension/reduction, name change etc
NC18.	Generation of bill for issuing new connection	When the Service Order for the' New Connection Approval is generated, the system should trigger the billing module to generate a bill inclusive of the development charges and security deposit.
NC19.	Generation of intimation letter	The system will generate an intimation letter informing him the bill amount etc. and last date of payment and will be sent to consumer by post, through email wherever available or any other information channels. E- mails should be sent automatically by the system and printed bills shall be dispatched by BESCOM staff.
NC20.	Multiple contract formats	The system should also have the flexibility of storing multiple contract formats (between BESCOM and the customer) catering to the different customer categories.
NC21.	Case by Case modifications to the contract	The system should have the facility for the user to specify a standard contract and make modifications to the same on a case to case basis.

NC2 2.	Accepting testing details	In response to the Service Order for new connection installation, the test report details should be entered into the system as a confirmation of the connection installation.
NC2 3.	Interfacing with stores for meters	The system should have the provision of accepting the number of meters available (of predefined types) through interface with online store management module (if implemented in future) and the business logic to allocate them. Based on this, the system can allocate meters to customers. In case of non-availability, system should be able to generate exception.

NC2 4.	Route plan and monitoring of Meter installation	Based on the allocation and the service levels defined, the system should be able to provide meter installation route plan. System should also monitor installation report of the meters.
NC2 5.	Generation of first bill	System should monitor generation of first bill of the consumer and raise exceptions after pre-determined period.
NC2 6.	Integration with GIS and updation of database	This module shall be integrated with GIS database and GIS based network analysis module for allowing a new connection for the purpose of checking the network capability for adding additional load, the necessity for capacity augmentation and for generating work order with material requirement. At the time of adding a new customer the updation of GIS data base is mandatory. The system should have the provision for tagging connections to the property i.e. identifying all connections in the same building/ plot/premises, along with indication of their share of built up area. The tagging of connection with property should be superimposed on GIS maps to facilitate accurate dues transfer and facilitate site survey.

In addition to above functionalities, the system shall also have the following features/ functionalities:

(i) Importing data from a third party system
(ii) Bulk uploads through csv files etc.
(iii) Online Web Application based on Work Flow as per the Business rules, Tariff, SOP, Revenue Manual, Commercial orders/ Circulars issued time to time &latest amended of the DISCOM.
(iv) Further the consumer shall be able to track the status of the applications and shall receive email, SMS alerts on the application stage and status. The modules shall incorporate all the existing stages and business rules involved in processing the new consumer application. Comprehensive dashboards and reports shall depict the number of applications received and applications at each stage and if the applications are being processed within as the regulatory standards.
(v) The module shall facilitate bulk importing of master data of consumers created from third party systems/schemes where bulk connections are released and data is provided in soft digital form.
(vi) The module shall have functionalities for inter division transfer of consumer master data and merging of accounting units etc.

(vii) The Module shall facilitate grouping of consumers based on various requirements for group bill generation etc.

(viii) Bulk field electrical network re-alignments like updating of feeder code, TC reorganization etc., shall be facilitated in batch mode for making the changes quickly.

(ix) The status of the applications, application pending at various stages shall be made available through drill down dashboards right from corporate level to the sub division or OM level.

(x) Receiving job completion and meter/transformer/line work installation / exchange related data electronically from SOS post execution of job.

(xi) Transfer of meter installation data to Billing Software for inducting the applicant as a Consumer.

3.3.7 Mobile Apps Development, Deployment & Maintenance:

3.3.7.1 The APPs developed should have the following basic characteristics and features:

1. The platform's used for development of mobile apps should support development of Hybrid Applications/Native Apps.
2. User Interface and User Experience of mobile App is to be designed to ensure that the service is user friendly.
3. Design of consistent visual elements and Web Portal & Mobile Apps architecture that is scalable and expandable.
4. Resolution independent Mobile Apps that will automatically expand/compress itself as per the device screen resolution and should be as per standards of W3C.
5. "Delivery of consumer App and Officers mobile applications should be in the form of a published mobile application on each platform in the marketplace (Google/ Android Play store and Apple store)
6. Integration with any existing applications through SOA (service-oriented architecture) - Web services/API/ JSON, Social Media platform etc.
7. The solution Framework, tools, technology of mobile App Development platform should be submitted along with technical proposal and should be able to address the future scalability requirements, in terms of both application (to add new services) and infrastructure and backend.
8. The mobile Apps should provide an update feature in case of newly published version.
9. The mobile applications will be hosted on mobile applications platforms (App store, play store, Microsoft etc.) whereas the web portal/application and services and related APIs will be hosted on servers/ cloud environment.
10. Provide technical documentation, design, architecture, technology, tools, etc. which will be used to develop Mobile Apps.
11. Integrate with the backend systems (user profile and registration, authentication, application processing, push notifications, etc.).
12. The data must be fetched from predefined data in central database and all the data should be directly updated to the central database.

13. The complete solution proposed must be SOA compliant and preferably based on secured open standards.
14. Vendor should have experience in hosting the mobile Apps and updating new versions as and when required. Vendor should provide all the details and should be part of technical proposal.
15. Mobile applications developed on development platform provided by the bidder should

run on all types of handsets/TAB/Smart phone existing as well as new handsets coming in the market. The bidder shall provide upgrades/patches etc.

16. The platform should provide the means to manage subscriptions of push notification services etc..
17. Mobile applications to be implemented in pursuance to the International & industry standard implementation standards and procedure for successful implementation of the project.

3.3.7.2 <u>Mobile Apps for Consumers:</u>

This shall support following features:

1. To operate in Android, Windows and iOS operating systems
2. Access of 'Quick Bill Pay' where the consumer may pay the bill on the go by furnishing only the consumer id; multiple bills may be paid by this option.
3. Consumer may apply for and check the status of New Connection / Additional / reduction load application.
4. Consumer may access his personal details like Assessment, consumption & bill paid for the last 3 years, and so on; more than one customer id (if any) may be added to a registered account.
5. Consumer may access the consumption calculator to check the energy consumption patterns.
6. Fresh complaints can be lodged and previous complaints tracked via the app.
7. Consumer may also request for:
    - Request Duplicate Bill.
    - Augmentation of load / regularization for installation of AC.
    - Informing non-usage of electricity during a certain period of time due to absence.
    - Registration of mobile no., email-id, DOB.
    - Energy calculator.
    - e-Bill registration.
8. One touch call / e-mail facility.
9. Reporting of cases of theft through the App.
10. Facility for accessing multiple accounts under single login to avoid switching between multiple login accounts. Facility to make online payment against multiple accounts by selecting the desired connection.
11. The consumer can stay updated with regard to the company, new launches, services, outages, useful tips, through social media tabs for Facebook, Twitter, and WhatsApp which are available in the App.
12. Provision for Self-bill generation by Consumer by sending Meter

Photo and Meter reading through Consumer Self Service portal / Consumer Mobile App.

13. Short message services for knowing bill amount, due date, previous payment history, updating KYC (email address, mobile number).
14. View / Download Annual ledger, view other transactions / charges levied in bill.

15. Facility to apply for shifting to pre-paid in case of Smart Meters.
16. Summary of all consumer account details are to be available here.
17. Latest Bill along with the amount to be paid and the due date can be viewed.
18. Payment History of the last 12 months should be available in the app.
19. Consumption history of the last 12 months should be available in the App.
20. All the features of the consumer web self-services shall be available on the mobile app.

3.3.7.3 <u>Mobile App for Employees:</u>

A comprehensive app for officers should be developed to monitor BESCOM performance, following features to be made available.

1. Login to the app should be able on designation and office hierarchy.
2. There are various login levels should be– corporate level (Can view all circles), Circle level (Can view all Divisions), Division level (Can view all Sub-Divisions), Sub- Division level (Can view all sections).
3. Dashboards should cover all key Performance Indicators (KPIs) of the BESCOM.
4. There should be provision of on Demand Reports/Dashboards.
5. Mobile should be developed in Hybrid mode so that it works on both IOS and Android Platform.
6. Dashboards should consist but not limited to of Billing Progress, Arrears, MR Tracker, defaulters, MIS, Day wise Billing, Metering and Energy Audit.
7. Each of these reports should have drill down option.

3.3.7.4 <u>Field Operations Functionality in the App (Connect, Disconnect, Meter installation and Meter replacement):</u>

Field Operations app should facilitate day to day operations of the field staff of the BESCOM. Following are the field operation that should be made available in the app:

1. Disconnection and reconnection module giving information about the arrears pending and route map for tracing the location of consumer premises.
2. Provision to execute and capturing the Disconnection and Reconnection details.
3. Capturing of Field inspection details in new connection process.
4. Preparation of estimate for new connections processing as per the BESCOM prescribed provisions, rates etc.
5. Provision to execute and capture New Meter Installation, Meter Change / Replacement activities. Capture photos of meters and geo-

location in the process of executing above activities and transfer to Server for authentication in real-time.

6. Capturing the location wise asset details during asset replacement/repair for assets like Feeders, Meters, CT/PT, Transformers, etc.
7. Printing Disconnection Notices, Amnesty Notices for issuing to consumers on site.

3.3.7.5 GIS Functionality in the survey App for Single Line Diagram of the 11 KV network with all electrical elements up to consumer:

1. Data capturing (Feeder wise GPS location of DTC, Pole, Consumer & indexing with feeders).
2. These apps should be capable of display of information on a Google Map or satellite Map on the Smart Phone.
3. Capturing various feeder information: The bidder shall capture the feeder information in a hierarchal manner.
4. GIS survey app should capture the important parameters of the assets.
5. App should capture Photo of the asset (DT, Pole and consumer location) etc.
6. The captures information should be able uploaded to GIS system.

3.3.7.6 Meter Testing Functionality in the App:

Meter Test report App would Facilitate to record the Meter Test Reports on the mobile App. It should have the following features:

1. App should have level wise logins for testing officers i.e., Sub-Division, Division, Circle
2. It should have three Joint Inspection Report (JIR) testing formats.
3. Should be able to record all the parameters required to create MTR report.
4. It should have the feature to download the reports in PDF format so that same can be shared to consumer at site using mail/WhatsApp etc.
5. It should record the GPS points of Meter Test Location.
6. Available Master details of consumer and meter to captured from billing system automatically.
7. It should auto fetch the details of last testing if JIR is filled earlier using this App.
8. It should have the option to capture/upload site photos.
9. It should have feature to capture digital signatures of consumer/testing officer.
10. Testing reports as prescribed by BESCOM should be available of Concerned Officer/Subdivision Billing module logins.

3.3.7.7 Vigilance Functionality in the Mobile App and Web application.

1. App should have level wise logins for testing officers i.e. Sub-Division, Division, Circle.

2. App To allow to register the Vigilance Clearance Report (VCR) online.
3. Available Master details of consumer and meter to captured from billing system automatically.
4. It should record the GPS points of Vigilance Location.
5. It should generate unique case identification number on Successful submission of load details/ in case of mob opposition unique case identification number shall be generated

without load details and load details of such cases can be filled using WEB module later.

6. It should have the option to capture site photos and videos.
7. It should have the option to upload the photo of seizure memo/manually filled VCR if any.
8. It should have feature to capture digital signatures of consumer/checking officer.
9. Cases registered through app to be made available on web module for calculation assessment part.
10. Should have provision to generate prescribed notices/ VCR format from web module.
11. Should have the proper tracing of cases from case registration till final conclusion.
12. Should have the reporting features as prescribed by BESCOM.

3.3.8 GIS based customer Indexing and asset mapping

The scope includes deployment of latest satellite imagery, survey of electrical network from EHV GSS to Consumer level, latitude-longitude of all the asset as per approved Data Model to be approved by BESCOM, mapping of entire distribution network of Discom on GIS map and regular delta up dation during entire contract period. The required GPS receiver for GIS mapping shall be on the part of successful bidder.

Requirement ID	Functionality	Description
G.1.0	**INTRODUCTION**	
G.1.1	Integration Capability of GIS software with existing modules	It shall be the responsibility of the bidder for integration/interfacing with the existing applications. Also the single window interface for GIS software and the existing applications (requiring interface/ interaction / data exchange with the GIS software) shall be provided with proper security levels. The desired modifications in the underlying database of existing system software / GIS software should be possible through this single window interface. The bidder shall make necessary arrangements to provide such kind of interface.
G.1.2	Application	Data model for data conversion: GIS Application Architecture should provide a

	Architectu re- Features	framework and the necessary programming interfaces to enable complex GIS applications to be developed and integrated with applications that already exist within. GIS Application Architecture should

		support the distribution of the functionality of GIS application across no. of components which interacts as separate process via process communication and control mechanism
G.1.3	GIS- Software-SLD creation feature	Create Single Line Diagram(SLDs) of electrical sub transmission network starting from 33kV bus of EHV sub station including 33kV feeders, 33/11 kV sub stations (with internals), 11 KV feeders up to 11/ 0.4 KV DT, LT feeders and LT poles. It should be possible to print/view the SLD of all or selected voltage level for desired distribution centers/ division/ circle.
G.2.0	**FEATURES AND CAPABILITIES OF SOFTWARE SYSTEM**	
G.2.1	**Generic Specifications**	
G.2.1.1	GIS Software-Architecture Type	**Open Architecture and COM Compliant :**
G.2.1.2	GIS Engine-Capability to work in all industry standard cross-platforms	The GIS Spatial Data Engine should work on all industry standard Cross-platform support, such as Windows/ Unix/ Linux/ Android etc. The application supports a fully extensible Component Object Model (COM) or Enterprise Entity Bean (EJB) or any other open standards architecture - compliant programming environment for customization and to have an open architecture system.
G.2.1.3	Compliance of GIS Imaging Software	**Proven Imaging Software System Platform:** The GIS Imaging software package with latest version, and spatial data base engine with database such as Oracle/MS SQL/MY SQL/ DB2/Informix/Sybase or any other RDBMS confirming to ANSI/ISO SQL-200n standards with latest version supplied shall have to be Open GIS consortium (OGC) registered compliant product time tested, widely deployed at multiple utilities worldwide.
G.2.1.4	Custom Functionality addition to application	The application supports an integrated customization environment to change the Ul and to add custom functionality, programmatically.
G.2.1.5	Software based functionality	The system shall provide support in the form of a documented interface specification (API) to allow software

	extensions to application	based functionality extensions, or integration with other products to be achieved.
G.3.0	**Database Management**	
G.3.1.1	Unique no. Allocation capability of Software	Customer Identification Number: The system shall be capable of allocating a unique identification number known as Customer Identification Number (CIN) to each Customer.
G.3.1.2	Functionality to PAN display	The system should have functionality to PAN the display across the screen.
G.3.1.3	Provision for Linking customer data to ledgers maintained prior to Customer Indexing	Provision for linking and maintaining records : Provision shall be made for linking and maintaining records (in Registers/ Ledgers) of Customer number as parameter, existing before implementation/adoption of the Customer indexing work under this specification. This shall be one of the relational data from archive of record, to be listed by the system.
G.3.1.4	Customer Database editing flexibility	Customer Database edit :The database shall be flexible for making changes in the Customer profile as required. The changes may be Customer name, location, connected load, category of connection, maximum demand, type of connection (HT/LT), and tariff related information.
G.3.1.5	Provision for linking customer data to ledgers maintained prior to Customer Indexing	Provision for linking and maintaining records : Provision shall be made for linking and maintaining records (in Registers/ Ledgers) of Customer number as parameter, existing before implementation/adoption of the Customer indexing work under this specification. This shall be one of the relational data from archive of record, to be listed by the system.
G.3.1.6	Database editing flexibility	Creating changes in the Customer and network entity attributes in relation to addition/ deletion of network entities, record of new Customer connections/ connections in response to other business process like billing and revenue system in geo database of GIS system.
G.3.1.7	Color Graphic	Color graphic displays and Color Coding :The

	Display of System Network	database shall generate color graphic displays of the system network which can be zoomed in / out. This shall represent each of the elements in the electrical system with suitable differing colors for the elements. The colour coding will be based on

		the rated voltage, Percentage of voltage at each bus, Percentage of loading of section, Symbols or any other chosen parameters by user.
G.3.1.8	Geographic Attributes Query in GIS software	Geographical attributes query :It shall be possible to query the geographical attributes of a specified location, preferably clicking on to the location or objects of interest and examining the contents of the database for the location of object.
G.3.1.9	Dynamic Attribute query of any object in GIS software	Dynamic selection of attributes : User should be able to dynamically select one or more of the attributes of an object, to be displayed as label of the object. This can be for viewing, plotting and printing purposes.
G.3.1.10	Representation of objects in different colors	Colors based attributes : System should support representation of the Entities/ Objects/Elements in different colors based on the attribute criterion.
G.3.1.11	Dimensioning Capabilities	The system should have Dimensioning Capabilities
G.3.1.12	Moving, copying capabilities	System should be able to perform move, copy, rotate, mirror and offset.
G.3.1.13	Real length specifying capability	System should specify the real time measurement / length while drawing the lines.
G.3.1.14	capability to save & restore views/layouts	Restoration of views /workspace/ layouts: System should be able to save and restore views / workspace / layouts.
G.3.1.15	capability to edit graphical & textual data	Entry / editing configuration on specific workstation: The graphical and textual data entry/editing shall be configured on specific workstation. The system shall allow facility to allow configuration of levels of security, whereby access and modification rights are appropriately assigned.
G.3.1.16	capability to provide customer details Dt wise	Details of Customers :It shall be possible to get a view of the details of the Customer or Customers connected to particular distribution transformer in a list form using a pointing device.
G.3.1.17	Capability to provide query	Menu driven Customers query : It shall be possible to zoom in / out on a particular Customer to obtain the desired degree of

	regarding customers in relation to power supply network	information. Menus shall be provided for viewing various combination of information related to any group of Customers. For example, it shall be possible to view only the list of commercial Customers fed from a particular feeder. Similarly electrical equipment parameters shall also

		be possible to be viewed.
G.3.1.18	Dynamic Attribute query of any object in GIS software	Dynamic configuration :The graphic user interface shall have a modular structure with main menus and sub-menus that allow users to dynamically configure their own user interface to required level.
G.3.1.19	Dynamic mode changeover capability of system	Dynamic switching over from one mode of view to the other : It shall be possible to view the system elements such as Customer location etc on, mapping and indexing work. It shall be dynamically possible to switch from one mode of view to the other by use of a pointing device. It shall be possible to view the physical system details in the background of the area maps created.
G.3.1.20	Database security provisions in system	Application Administration : Database Security : The data management system incorporates mechanisms to ensure data integrity, security and distribution as well as to retain historical information. The databases shall have password protections with varying degree of access definable by the administrator. The security shall be adequate considering web & Android enabled usage.
G.3.1.21	Provision of version management of Data	Version Management of the data - Changes / updates made to the base line drawing should be tracked as different versions.
G.3.1.22	Provision of multi-tiered architecture	Managing conflicts : Be able to see the latest drawing on the system which should be union of all the changes made by all of the users/multiple users at same time on single work order and manage conflicts arising due to the merge / post of different versions. Have multi-Tiered Architecture.
G.3.1.23	System capability of being operated through Web	System to support the Enterprise wise central database and remote users : System should be able to support the Enterprise wise/Circle wise central database and remote users over the Web even for the creation and editing operations without degrading the performance over the net.
G.3.1.24	System capability of supporting seamless data access	Support seamless data access between applications, which allow information in existing systems to be used without a need for migration or translation, ensuring a maximum return on existing investment.

G.3.1.25	System capability of representing technical data of internals of any system entity	Facility of representing technical data of the internals of system entity :The proposed system should have facility of representing technical data of the internals of system entity. For example, with a click of mouse on the substation user should be able to see internals of the sub station and on taking the pointing device to a Power Transformer, a 'pull down' menu to show user options such as Tech. data, connectivity data or maintenance record data to be displayed on request. The internals visible on clicking on the substation should be dynamic in nature and not merely static snap-shots.
G.3.1.26	specific data model	The application should provide a data model specific for electric utilities. Bidder is requested to provide, along with documentation as part of their proposed system, a database schema that facilitates data access via queries and new applications. A data model is an advantage and would help realize the data warehouse concept.
G.3.1.27	specific data model	The data model should also be customizable to incorporate the user specific needs. should also provide the final data model to other parties for the purpose of interface development or building new applications.
G.3.1.28	Data import/ Export capability of GIS software	Import / Export of data : The software should have the capability to import/export both data and graphical information in wide variety of formats (e.g. Access, Excel, DXF, DWG, MID, Geo-Tiff, Jpeg, MIF, TAB, E000, and DGN)
G.3.1.29	Data export capability into XML format	The system must support export of data into XML format.
G.3.1.30	Ability to support Customer Data	System should support Customer master data, Customer billing data, GPS data to create network.
G.3.1.31	Capability to import Satellite Imagery Data	Import of satellite imagery in different formats like Geo Tiff, JPEG etc.
G.3.1.32	capability for importing & displaying color raster images	The software should have the ability to import and display both color and multiple gray scale raster images. Transparency of the image should be user controllable to allow for viewing items regardless of drawing priorities. The importable raster files formats should be of the same types listed in the previous

		requirement.
G.3.1.33	capability for importing & displaying color raster images	Opening / attachment of standard format files for schematic representation without importing into the mapping system: Should be able to open / attach all standard format files like Visio, Power Point, Excel, DWG etc. for Schematic representation without importing into the mapping system.

G.3.1.34	Capability to provide query builder	Supporting multiple / complex SQL queries :System should provide query builder and support multiple / complex SQL queries.
G.3.1.35	capability to support sorting /filtering of records	Should support Sorting, Filtering and display records in Tabular/ Browser formats.
G.3.1.36	capability to save queries in text format	Should be able to save the queries as well as the output in text format.
G.3.1.37	Highlighting capability of user specified attributes	On Query, the system should be able to highlight the objects based on the user specified boundary or attributes for visualization.
G.3.1.38	capability to support web & android OS enablemen t	System should support the easy web & Android OS enabling of the application.
G.3.1.39	capability to store CAD & GIS data	Store and manage CAD and GIS data in a single repository.
G.3.1.40	capability to store CAD & GIS data	Support automated spatial and attribute data entry validation.
G.3.1.41	Capability to translate geospatial data sets	Translate vector and raster geospatial data sets from a variety of standard and nonstandard projections and datums.
G.3.1.42	Updation of RDBMS attribute data on spatial changes	Automatically or manually update RDBMS attribute data when spatial changes are made.
G.3.1.43	Capability to support distributed databases	Support for distributed databases within flexible, scalable, multi- tiered, partitionable architecture.
G.3.1.44	Capability to modify asset data	The system shall be able to be configured to add additional asset types and to modify existing definitions of assets, such as the addition of additional attributes, without the need to involve the software vendor. Such configuration is to be achieved using Data

		Dictionary style tools and not require re-compilation of the software.
G.3.1.45	System availability due to report run	Report runs and any other batch jobs should not affect system availability.
G.3.2	**Spatial database features**	
G.3.2.1	capability to support all	Database support: All Industry standard RDBMS should be supported viz. Oracle/MS SQL/M

	industry std. RDBMS	SQL/DB2/Informix/Sybase or any other RDBMS confirming to ANSI/ISO SQL-200n standards
G.3.2.2	Database portability	Database portability: Each Table or layer should be independently exported to a file and restored into the supplied database.
G.3.2.3	Multipoint editing permissibility	Schema portability: In an enterprise-wide GIS, there may be different groups working on the same datasets at remote locations. To enable them to work on this dataset, one should be able to port the owner's schema to the remote database, let them edit the dataset and then bring back the changes after some time interval.
G.3.2.4	capability to store additional data type	Additional data types: User should be able to store custom objects, dimensions.
G.3.2.5	Published API‟s for interface to master database	Published APIs :Software must have published free java and C APIs and development tools for custom development and interface to master database.
G.3.2.6	capability to support direct editing of spatial data	Support for direct editing of spatial data in the DBMS including multiple user editing with long transactions and advanced rule- based editing with GIS Client.
G.3.2.7	capability to serve database directly to internet mapping server & desktops	Serving the Database directly to the Internet Mapping Server and desktops should be possible without any conversion. Map server can upload a configurable amount of data to the users workstation based on different pre-defined situations / network load.
G.3.2.8	Capability to enable map browsing in folders & DB	The ability to view and browse for maps in the contents of folders and databases is supported.
G.3.2.9	Capability to preview map & table data	Map data and table data can be previewed.
G.3.2.10	Capability to support OLE DB	Object Linking and Embedding database (OLE DB) providers is supported.

G.3.2.11	Capability to manage data sources	The application provides the ability to manage data sources and database connections.
G.3.2.12	Capability to manage coordinate systems	The application supports the ability to define and manage coordinate systems.
G.3.2.13	Ability to create & maintain metadata	The application provides the ability to create and maintain metadata and store as XML data.

G.3.2.14	Capability of DMS to provide spatial-indexing	The data management system provides spatial-indexing (i.e. a method of breaking down the master file by allocating each map an index in order to decrease the screen refresh and data access times.
G.3.2.15	Capability of DMS to permit users to manage features	The data management system allows users to choose between managing features on an individual feature basis (user-specified features) or grouped by a logical selection.
G.3.3	**CORE GIS FUNCTIONALITIES**	
G.3.3.1	Core GIS Engine specs.	Core GIS Engine : The Electric GIS Desktop software should be built on top industry standard core GIS Engine having the following functionalities
G.3.3.2	Layer Creation capability of GIS software	Create layers from all supported data sources including coverage feature classes; shape files; computer-aided design, TIN, raster, and geo database feature classes; or tables containing x,y coordinates.
G.3.3.3	Group Layer creation capability	Create group layers from multiple data sources including vector overlays on top of raster data/ images.
G.3.3.4	Layer storage capability of GIS software	The application should allow users to define and save various user specified views, for example by storing collections of layers.
G.3.3.5	Preset Layer configuration permissibility	The system should allow preset layer configurations for specific plotting applications.
G.3.3.6	Intelligent layering capabilities	Intelligent layering capabilities. Ability to show only certain layers at a given scale and for a given condition (i.e. type of service call).
G.3.3.7	Manual layering capabilities	Manual Layering capabilities. Ability for the operator to turn Layers on and off at will.
G.3.3.8	Data previewing capability	Data Preview :Should provide facility to preview the data before Loading. Drag & Drop layer from the preview window to the map.
G.3.3.9	Report Generation capability	Report Generation : The software should have inbuilt industry standard Reports Generation tool both at Server and Desktops.
G.3.3.10		a) Facility to display Aerial, Projection and Surface distances.
G.3.3.11		b) Feature Labeling : Should have the facility to label features based upon fields or expression of two or more fields.

G.3.3.12		c) Registration, rectification & storage of Raster and Vector data in a single database must be possible.

G.3.3.13		d) Must support Topological editing capabilities.
G.3.3.14		e) Defining rules for Topology like rules to make sure that no polygon overlaps another polygon in the same data, polygons should form a continuous surface with no voids or gaps, lines in a data should connect to one another, dangling and pseudo nodes removal
G.3.3.15	Bookmark creating capability	Create Bookmarks: Facility to Create, Edit and Move To Bookmarks. Bookmarks will be created to store the information of the display Extents of the map.
G.3.3.16	Spatial querying engine facility	Spatial querying engine that can retrieve specific features based upon a user determined buffer zone around a point, line, or polygon.
G.3.3.17	Transparency of data to user when queried	When user workstation requests additional data from the server, this should be transparent to the user.
G.3.3.18	Availability of out of box tool for addressing queries.	Out of the box tool for geo- positioning based on software operator initialized address queries.
G.3.3.19	Software ability to enable point & click access to data	Point and Click access to data (static objects as well as moving objects).
G.3.3.20	System ability to perform cluttering & decluttering of data details	Cluttering and decluttering - The application should have facility of cluttering and decluttering The process of showing more details as users zooms in is called cluttering and process of hiding details as user zooms out is called decluttering
G.3.4	**NETWORK MANAGEMENT**	
G.3.4.1	Functionalities	This module shall have the following functionalities -
G.3.4.2		a. Create a new network
G.3.4.3		b. Open an existing network
G.3.4.4		c. Merging of two networks
G.3.4.5		d. Cut and paste part of the network
G.3.4.6		e. Display a partial network of the area of the interest
G.3.4.7		f. Delete a network

G.3.4.8	Abilities of Network Mgmt.	The application provides the ability to create, maintain and save a geometric network using designated features or by adding features to an empty geometric network.
G.3.4.9		The application can create and maintain flow direction in a geometric network based on the current configuration of sources and sinks.

G.3.4.10		The application can create, maintain and save flags or starting points for trace operations.
G.3.4.11		The application can create, maintain and save barriers for use in trace operations.
G.3.4.12		The ability to disable features and layers to create a more permanent barrier for tracing at a particular location shall be supported.
G.3.4.13		Customized trace results can be created, maintained, and saved.
G.3.4.14		The ability to perform network analysis along with the display of its result shall be supported.
G.3.4.15	User capability to connect/ dis connect a network feature	The user should be able to disconnect and reconnect a network feature.
G.3.4.16	Network impedan ce criterio n	The system defines different network impedance criteria to support analysis at different times of the day.
G.3.4.17	Tracing of network	The system allows for the tracing of networks to identify land parcels or customer information affected by network interruptions.
G.3.4.18	Export of network analysis product	The system allows the export of network analysis product to third party modeling packages.
G.3.4.19	Capability of network mgmt. module	Network topology processor :The module shall have the facility to identify the objects in a feeder and the feeders of a substation for purpose of color coding etc The module shall have capability of displaying hanging sections and loops in distribution networks.
G.3.4.20	Capability of GIS to handle network problems	Handling network problems :GIS must be capable to handle network problems, such as road network analysis, which facilitate evaluation of the shortest path between two points.
G.3.5	**Tracking Changes -**	
G.3.5.1	System capability to track	Proper relationships shall be established in the database between the various entities. Further, hierarchical relationships should be established between various elements to link and group

	changes	them at any voltage level. It should be possible to change the hierarchical parent of any

		element i.e. any element along with all its children in a hierarchical relationship can be made child of any other element. Such shifting should be possible only where voltage levels match. The time of making such changes shall be tracked. This arrangement should enable rearrange entity relationships with time stamping.
G.3.5.2	System ability to keep track of changes in customer attributes	The database shall keep track of all such changes in any of the Customer attributes such as change in name, connected load, tariff category, connection status, meter changes etc.
G.3.5.3	System ability to provide information regarding outage affected customers/ areas	Affected Customers/ Areas: Software should have standard tools to find out affected customers in case of an outage. This must allow finding affected Customers/ areas in case of an outage or as a result of switching operation. The user shall get the affected Customers / areas by placing a flag at the point of outage..
G.3.5.4	Software capability to create & store standard displays at system & user level switching operations& looped network	Switching & Looped Network :The software must support switching operations and recognize the status of the downstream network based on the switch position, on or off. The software must also support looped network in GIS.
G.3.5.5	System ability to perform QA/QC on data created	QA/QC of GIS Data: The application should have tools to perform QA/QC on the data created. The software must be rule based. These rules should be configurable to suit requirements.
G.3.5.6	**The QA/QC tool must perform QA/QC based on the following :**	
G.3.5.7	Attribute level QA/QC	Attribute level QA/QC as per the domains defined for the particular attribute: e.g. user cannot enter an incorrect voltage level and chooses from a drop down list of voltages
G.3.5.8	Connectivity rule-QA/QC	Connectivity rules e.g. a 3 phase tap cannot be taken from a single phase line.

G.3.5.9	Relationship rule- QA/QC	Relationship rules e.g. a PMT transformer can be placed on top of a pole only.
G.3.5.10	Contingent Validity Rule- QA/QC	Contingent validity rules : A set of valid values that depend on the value of another attribute.
G.3.5.11	Customer Validation Rule-	User's custom validation rules The QA/QC functions shall have the feature to save the report/ result of the QA/QC and

	QA/QC	the tools should also provide with the error messages information to help user correct the errors.
G.3.5.12	Location Display facility in GIS	Location Display :Facility to display a given location when the location code or object code or latitude/longitude are specified.
G.3.5.13	Location Tracking facility in GIS	Location Tracking :The system shall keep track of the location in the network from where a particular Customer is fed. This shall be achieved in conjunction with the network data created for the area.
G.3.6	**Creation of Favorites & Mass attribute updates :**	
G.3.6.1	System permissibility for creation of favorites	The system should allow creation of Favorites. These would be entities that are created from the complete generic library of models having predefined attributes.
G.3.6.2	System ability to save Favorites & allow mass attributes update	The system must allow saving of Favorites organize and save attribute values of often-used features. The system must also allow mass attribute updates. This would help user in speeding up data creation.
G.3.6.3	Digitization of electrical symbols	DIGITIZATION OF ELECTRICAL AND LAND BASE SYMBOLS
G.3.6.4	The digitization module shall have the following functionalities :	
G.3.6	**Desktop functionalities**	
G.3.6.1	**Desktop functionalities**	The application requires that information (metadata) be stored about a map.
a		The application supports a customizable graphical user interface.
b		The user will be able to create hyperlinks to any document or URL and store the hyperlinks with data in an attribute field.
c		The application can save a map in a thumbnail image.
d		The application can store data using different paths.
e		The application can create, store and maintain map templates.
f		The system can store true 3-D features (X, Y & Z coordinates).
G.3.6.2	Display	**Display Properties**

	properties	
a		The application requires the use of specified projections.
b		A variety of data sources can be displayed.

c		The application supports the ability to set background and symbols
G.3.6.3	Vector data display	**Vector Data**
a		The application supports the ability to label definition and position
b		The application provides a display threshold for vector layers
c		Allows user to focus on an area of interest.
d		Tool tips can be created for toolbar buttons.
e		Selections can be customized.
f		The application provides the ability to manipulate map features.
g		A definition filter based on an SQL expression can be set up.
G.3.6.4	Raster data display	**Raster Data**
a		The extent of raster image can be set.
b		Image brightness, contrast, and transparency can be changed.
c		The application provides for re- sampling for geometric transformations and for converting grids to other resolutions.
G.3.6.5	Data query properties	**Data Query**
a		The application can query data using a number of different expressions.
b		The application allows query expressions to be saved and loaded.
c		The query language supports querying against a set of features, which are the result of executing a previous query.
d		The system allows features be selected for data editing in the following ways: Geographic window; Selection by mouse;
e		Selection by SQL query.
f		The NOT qualifier can be applied to any spatial operator.
g		Query results are displayed or plotted in user-defined symbology.

h		Query results can be easily formatted in a report. The report writer has a forms-driven user interface for the interactive definition and formatting of the report.
G.3.6.6	Symbol related properties	**Symbology**
a		The user can assign values to attributes (scaling).
b		The application supports symbol classification.
c		The application supports color ramps for symbols.
d		The application supports label text.
e		The application supports the ability to perform statistics.
f		Interactive map symbol display capabilities are provided.
g		The user can predefine feature characteristics, such as line style, weight, color, symbol and angle, for features and text for the system to use as a default when displaying features.
h		Display attribute-based symbology.
G.3.6.7	Symbol Editing & management prop	Symbol Editing and Management
a		The application supports EMF and BMP formats.
b		The application provides symbol- editing support.
c		The application provides the ability to create and edit symbols.
d		The map production system generates point symbols based on any attribute associated with a point. The software supports a variety of point symbols, including both system default and user- specified symbols.
e		The map production system generates line symbols based on any attribute associated with a line. The software supports a variety of line symbols, including more complex line symbols and the custom creation of user-defined line styles (including color, pattern and width).
f		The map production system generates polygon shade symbols based on any attribute associated with a polygon. The software supports a variety of shade characteristics for each polygon shade symbol, such as shade line colors, angles, patterns, line widths and separations.

G.3.6.8	Labeling properties	**Automatic Labeling**
a		Conflict detection is provided.
b		The application supports labeling of multiple layers.
c		Interactive text can be placed on a map.
d		The application supports annotation stored with a map as a group or stored separately in a file or database.

e		The application supports feature linked annotation.
f		The application allows users to position and orient labels and graphics in a data frame or position map elements on the layout.
g		Supports transparency layers.
h		The application supports predefined label styles.
i		Support is provided for label display of a subset of features.
j		The application supports symbols as labels.
k		Labels can be stored in a graphic layer.
m		Manual placement of feature labels is supported.
n		The system shall allow for scalable fonts that allow changes to font type, height, width, color, etc.
o		The system shall support multiple lines of text with full justification options available. Justification options include, top left, top center, top right, center left center, center right, bottom left, bottom center, and bottom right.
G.3.6.9	Graphic properties	**Graphics**
a		The application supports text as graphics.
b		Different graphic shapes are supported.
c		Graphic editing is supported.
d		The application supports graphic placement and manipulation.
e		Moving, rotating, and ordering graphics is supported.
G.3.6.10	Feature Editing properties	Feature Editing
a		The application supports feature editing.
b		New features can be created.
c		The creation of features at an x, y coordinate location is supported.
d		Features at a specified length or angle can be created.
e		The application supports the creation of segments using angles from existing segments.
f		True curves can be created.
g		The application supports copying a line at a specified interval.
h		The application supports creation of a buffer around a specific feature.
i		Mirror images can be created from existing

		features.
j		Merging features from the same layer into one feature are supported.

k		The application supports combining features from different layers into one feature.
l		The application supports the creation of a feature from features with common areas.
m		A new polygon with shared parts can be created.
n		The application supports the ability to modify existing shapes.
o		Splitting a line or polygon is supported.
p		The application supports trimming a line, line extensions, flipping a line.
q		The application supports the modification of existing features.
r		The application provides support of topological editing capabilities.
s		A comprehensive snapping environment is supported.
t		Copying and pasting attributes are supported.
u		Relationships between features and attributes can be created.
v		Validation rules are supported.
w		The application provides digitizer support.
x		Undo/Redo framework is supported.
y		The system allows attribute data to be interactively entered or edited using default field values (such as ownership) or user-defined values at the time of entry (such as by equipment identification number).
z		The system can automatically update attribute values based upon changes to a feature's geometry, changes to other attributes, or the creation of a new feature, thus ensuring database integrity.
aa		The system supports the manipulation of sets of features, such as deleting, moving, querying and updating attributes.
ab		The system supports the interactive merging of two identified lines with and without an attribute comparison,
ac		Digitizing allows for key-in by coordinate geometry
ad		The system supports "on-the-fly" digitizing techniques, such as line following and attribution during digitizing.
ae		The system allows for the automatic

		generation of points :
af		- At the midpoint of a feature;
ag		- At the endpoint of a feature;

ah		- Projected (and vertex-inserted) onto a feature;
ai		- Perpendicular to and from a feature;
aj		- At a distance along a feature;
ak		At a distance from a given point in a given direction;
al		At the centroid of an area feature
G.3.6.11	Data formatting properties	**Data Formats**
a		Bidder should list the vector formats supported and editable by the proposed solution.
b		Bidder should list the raster formats supported by the proposed solution.
c		Bidder should list the formats in which the product can export data.
d		The proposed GIS allows data to be input from the following
e		sources : Hardcopy maps; Digital coordinate ASCII files; Batch processing (to load attribute data).
f		The system allows ASCII data (both coordinate and attribute information) to be loaded as features, which are optionally linked to attribute records. An interface for ASCII format definition, modification and loading is provided.
G.3.6.11	Table Managem ent properties	**Table Management**
a		The application provides the ability to view data in a table.
b		The application supports table data selection and editing.
c		Aliases can be defined in tables.
d		Field values can be calculated.
e		The application provides the ability to find and replace functions in tables.
g		The application provides the ability to freeze columns during display.
G.3.6.12	Chart properties	**Charts**
a		Bidder should list the different chart formats the application supports.
b		Graphics and charts should be editable

G.3.6.13	Buffer Analysis Properties	**Buffer Analysis**

a		The application provides the ability to create buffers.
b		The ability to output buffers is supported.
G.3.6.14	Spatial Analysis properties	**Spatial Analysis**
		Data can be merged and joined.
G.3.6.15	Data mgmt./ compilation tool	**Data Management/ Compilation tools**
a		Data compilation tools for using data that is obtained in multiple formats
b		Boundary creation tool. Need the ability to clump areas together from different layers (I.e. counties, zip codes) and create one area/polygon on a new layer with its own attributes. Also require manual boundary modification tools.
c		Geocoding Tool for objects based on street addresses.
G.3.6.16	capability to support Page Template properties	Page Templates define and store standard map page elements to retrieve later. A page template defines the size, orientation, and map elements for a standard map. Similar to a template for a word processing document that defines the styles and format, a template saves time and repetition by storing elements used on every map. These then can be used for printing. The application should support creation of above-mentioned feature at system as well as user level.
G.3.6.17	tools for navigating large maps	The software should have tools to navigate large map documents quickly by finding, highlighting, and moving features. It should support tools like:
		a) Locator tool
		b) Copy
		c) Quick Attribute viewer
		d) Delete
		e) Highlight
		f) Pan Zoom to Etc
G.3.6.18	Feeder Management properties in software	Feeder Management : The application must have a feeder management to manage and trace specific feeders and must have the following capabilities :
		a. Help generate circuit map for a desired feeder

		b. Help locate all features or tie devices associated with a feeder

		c. Select features belonging to a particular feeder or group
		d. Show feeder information graphically in a map display (loops, islands, and double feeds or extra feeds)
		e. To assign energized phase information to each feature in a circuit indicating by name (R, Y, or B) the phases of electric power that can reach the feature from the power source(s) for the circuit.
G.3.6.19	capability for Schematic layout of compound objects	Schematic Lay out of compound objects –The module shall have capability to blow up compound objects like substation, DT, feeder pole, LT pole etc showing single line diagram of arrangement.
G.3.6.20	Pole Code Generation facility	Pole Code Generation -This module shall have the capability to generate code for poles on a feeder as per user- defined format. The typical examples are 11 kV pole coding comprising substation code / substation name, feeder code, serial no of pole which can be continuous or varying on basis of laterals and sub laterals. – e.g. The 33kV cables are laid at 3 ft depth, 11 kV at 2 ft depth and LV cables are laid at 1 ft depth. It should be possible the no of cables at each depth and configuration of the trench etc.
G.3.6.21	New symbol/ attribute	The user should be able to create any new symbol and also specify its attributes.
G.3.6.22	Symbol/ attribute limitation	There shall not be any limitation on the number of symbols or the number of attributes for a symbol. Attributes associated to each of the entity/object /element should be user definable like Data type, Lengths as per record of SEB, Access restriction, Pull down list and Mandatory / Optional.
G.3.6.23	customized Representation of entities/ objects/elements	Customized representation of entities/objects/elements: System should allow the user to customize the representation for each of entities/objects/ elements.
a		Point
b		Line
c		Polygon
d		Text
e		Color
f		Hash pattern

g		Line style (Dashed, Dotted...)
h		Font
i		Point shape (Round, square, user defined...)

G.3.6.24	Type Of attributes	The attributes can be text; Number; reference of AutoCAD Drawing, Raster image, Photograph, etc.
G.3.6.25	Software customizatio n n for electrical symbols & land based features	The software shall be customized to provide the electrical symbols and land based features. As already stated, whenever user wants, he can add any number of attributes to a symbol and also create any number of new symbols. This capability should be demonstrated at the time of demo.
G.3.6.26	Capture of all attributes while digitizing	Capability to capture all the attributes, while digitizing each symbol as specified by data dictionary, through a user friendly dialog box .
G.3.6.27	Creation of Spatial database	As and when each symbol is digitized the attribute database, the spatial database should get created instantaneously.
G.3.6.28	Support raster images	Support raster Images / scanned photographs.
G.3.6.29	Multi circuit Representa tion	Multi Circuit Representation On a pole or a tower, more than one OH line may be running. These lines may be different voltages or same voltages. The application program should provide for digitizing and display of these multi circuit lines. On clicking of multi circuit line, the configuration of Line shall be displayed.
G.3.6.30	Land base representation	Land Base Representation : The land base shall be made intelligent. Various queries shall be made available for different entities in a land base area of power network premises. Each entity will contain a minimum of five to six attributes to carry the basic information like Name, Address, Circle/Div/Sub- div/DC, Service Number, Telephone Number, etc. The software shall be able to build the topology on its own to ease this query process through the intelligence.
G.3.6.31	Text Editing Ability	It shall be possible to edit the associated text for its presentation. This shall be achieved for the users with the proper security rights.
G.3.6.32	Identification of electrical entities in GIS	All of the electrical entities and accessories shall be identified by their name information of the substation in addition to their alphanumerical database information of interest, which is associated with each item.
G.3.6.33	GUI availability to perform graphic	An interactive tool like icons in a toolbar, graphical user interface (GUI) shall be available to enable the users to perform their graphics handling operations such as zooming,

	operations	panning, highlighting, selection, clicking an item for its alphanumerical details etc.

G.3.6.34	System ability to provide information using GUI	The following information shall be queried using the user- friendly GUI by just selecting the category of the query. The results shall be made available in the graphics by highlighting them and/or in the non-graphical text report forms.
a		Connected load information, which is fed from the substation.
b		List of Customers based on the connected load
c		History information of load readings of the transformer and outgoing LV distributor cables etc.
G.3.6.35	Query Type	Name of the substation. This will enable to highlight the selected elements
a		Name of the area of the substation
b		Display of service numbers of the Customer fed from the substation
c		The entities located in the downstream of the substation
d		Through a polygon retrieval i.e. selecting a window area from the overview map, the software shall highlight and retrieve all the substation
e		The software shall highlight the respective substation by query i.e. substation located in a particular zone, substations located in a particular area.
G.3.6.36	Report availability on non-graphic query	Following reports shall be made available after the non- graphics query :
a		List of substation connected on a particular Feeder
b		List of substation based on capacity of switchgears/ transformers
c		List of substation based on make of electrical entities
d		List of substation based on breakdowns
e		List of substation commissioned during the specified period.
G.3.7	**Cables and Other Electrical Components Representation :**	
G.3.7.1		Replacing the line designation by selecting a new line designation. This is nothing but the "changing the line type" method.
	a	Updating the cable's non-graphical data through an interactive GUI mask.

	b	Displaying the cable's non- graphical data on to the graphical space
G.3.8	**Software capability to check electrical continuity for power flow**	

G.3.8.1	a	The electrical line tracing till the end of the line by considering the switch positions on the line. The line will have to be highlighted after the tracing.
G.3.8.2	b	By ignoring the switch position conditions, the line shall be traced for its continuity and same shall be highlighted
G.3.8.3	c	By selecting the text attributes attached to a line, the tracing shall be possible.
G.3.8.4	d	Through a non-graphical data.
G.3.8.5	Addition of electrical element in cables followed by updating of data	It shall be possible to insert any of the chosen electrical devices on a multiple feeder cables. For instance, the electrical device will be connected with all of the lines in the multiple cables. Similarly, there shall be a provision to insert the electrical device net point on to individual cables in the multiple cable lines. The other functions shall be made available as listed below through a simple clicks by mouse button:
G.3.8.6	Software ability to represent cables / switchgears	It shall be possible to represent cables/switchgears/HV- EHV cables under existing scenario.
G.3.8.7	Calculation of length of upstream or downstream cable/conductor	It shall be possible to calculate the length of downstream or upstream from the selected element.
G.3.8.8	Retrieval of electrical elements within polygon	It shall be possible to retrieve / query the elements like cable within the polygon.
G.3.8.9	Tracing of customer ’s electrical connectivity	It shall be possible to trace electrical connectivity of a Customer. By default, the connectivity should be traced up to its feeding substation/Pole Mounted Transformer (PMT).
G.3.8.10	Ability to attach scanned drawing	It shall be possible to attach scanned image of service SKETCH to a particular service number.
G.3.8.11	Software capability to search &	It shall be possible to search and zoom into the user-defined distance around that service without any

	zoom in any drawing	drawing sheet boundaries. The default distance shall be 100 meter around the service point.
G.3.8.12	Project Administrati on n features in software	The software shall include the Project Administration features. The software shall enable the facility to address multi-project environment
G.3.8.13	Layer Mgmt. Features	The software shall include the Layer Management features. This function shall enable to assign descriptions to the layer. The composition of various objects shall be allocated in unique layers, depending on the user requirements.

G.3.8.14	Task Management features	The software shall include the features of Task Management, by which the geographical data access will be controlled and monitored. This feature utilizes the security features administered by Data, Project and User administrators. It should also administer the interim backup storage, mechanism internally.
G.3.8.15	Different accessing modes of area	Different accessing modes of area/ locality shall be possible in the software. Some of the modes are listed below :
G.3.8.16	a	Co-ordinate
G.3.8.17	b	User specific
G.3.8.18	c	Area
G.3.8.19	d	Map sheet number (Index for the map sheet shall be created).
G.3.8.20	e	Polygon or any shape of interest
G.3.8.21	Creation of relationship between network components	Automatic creation of relationship between the network components while creating them. Besides that, the system is necessary to have facilities to generate, store, retrieve, edit, delete and display information on infrastructure assets, Customers through proposed system. The system should provide the facility to plot or print the base map or facility map to plotter or printer as well.
G.3.8.22	Capability to create multiple features easily	The application should provide users with the capability to add multiple features with a single mouse click i.e. without picking each entity separately. This would help in speeding creation of network. For example adding a new service to a customer, the application should automatically know the set of facilities to be placed as per the category of the customer (industrial, residential etc)
G.3.8.23	Zooming facility in drawing	Zoom in/Zoom out : The user will have option to view an area with about 2000 objects (Customers, DTs, Cables, Poles, Junction Boxes, Etc.) represented on a Visio Interface and zoom in to sections of the drawing.
G.3.8.24	Zoom sensitive layer control	The user should be able to define the number of objects displayed at any zoom scale (zoom-sensitive layer control).
G.3.8.25	Connectivity to ODBC data sources	Connectivity to ODBC data sources : The objects shown on the interface would be connected to an ODBC Data source in the back end.
G.3.8.26	System ability	Drawing schematic electrical network of a

	to Draw automatically from database	selected area automatically from the database. It will be possible for the user to plot the schematic electrical network of a selected area on a blank page in the interface based upon a selection query on the database.
G.3.8.27	Software ability to exhibit data	Intelligent objects on the diagram showing data from back- end database on double click. The objects shown on the

		interface would be connected to an ODBC Data source in the back end. On double clicking an object in the interface a form would be shown with most relevant data, there would be options on the form to drill down and retrieve data in greater detail.
G.3.8.28	Pictographic representation of assets	Pictographically representing assets in the distribution network.
G.3.8.28	Stencil Features	The stencil provided in the Interface would have icons to represent constituents of the electrical network like feeders, Sub Stations, DTs, Junction Boxes, Cables, Poles and Customer Connections etc. These can further be colour coded to easily identify objects of similar rating. E.g. User would have an option to draw all 11 KV feeders in Blue objects on the Visio drawing can be text labeled.
G.3.8.29	GUI ability to accept query & provide result data on diagram	Query on the database and representation of result data on the schematic diagram. The interface would have a query through which the user would be able to select information from the database based upon specified parameters. The result set can then be either highlighted on the existing network or plotted on a separate page.
G.3.8.30	Printing capability of object data	Printing :Object property data shown in forms should be printed from Visio with the reporting tools.
G.3.8.31	Ability to find element on drawing	Finding an element on the drawing :It should be possible to find and highlight elements on the drawing through query.
G.3.8.32	Ability to draw a section of drawing	Drawing in parts :It should possible to draw a section of the complete network in a separate page from the seamless database and maintaining connectivity between pages.
G.3.8.33	Software facility to Represent internals	Representing Internals :The software shall have facility of representing the internals of objects like a sub-station.
G.3.8.34	Report Creation Tools	The software should have industry standard report creation tools which would allow end users to create new reports with desired formatting functionalities such as sorting, filtering & display records in Tabular/ Browser format.
G.3.8.35	Software ability to	User Friendly interface Network Symbol Library – The software should accept the user

	accept defined symbols	defined symbology applicable at the . It should be possible to view the same network with different symbology in different views without changing the database, by storing the new display configuration. For example feeder view where different feeders of voltage level shown in different colors, outage view where live and energized line segments are displayed

		in different colors etc. all without changing the back end database. This would allow the users to view the network as desired by them.
G.3.8.36	Provision of extensive library of symbols	The system should provide an extensive library of oriented symbols, allowing possibility of modification, if required. The system should also have the facility to create new symbols as per client requirements.
G.3.8.37		Modes Of digitization: The digitization module shall have the following Capabilities :
G.3.9	**Validations of Digitization**	
G.3.9.1	Provision of Library of validatio ns	The application shall provide library of validations and facility for user to choose the validations for any symbol existing or added to package. The validations shall be stored in database as stored procedures.
		Typical validations are : Voltage of two objects / buses to be connected shall be the same; Voltage of any bus shall be one of
G.3.9.2	Typical validations	standard voltages defined; the ratings of equipment shall confirm to standard ratings defined;
G.3.9.3	List of validations	The bidder shall prepare a list of validations proposed for each symbol and take approval of .
G.3.10	**Specifications for the internet mapping server to enable the web/ android OS enabling of the spatial data -**	
G.3.10.1	Cross Platform support of internet mapping software	Cross-platform support :It Should work on all industry standard cross platforms with latest versions at the time of bidding, such as Window/Unix/Linux.
G.3.10.2	Web & Android OS Server support of internet mapping software	Web & Android OS server support : Several Web & Android OS servers should be fully supported with support of all industry standard servlet engines
G.3.10.3	Scalability & reliability of Internet Mapping software	Easier to install: - Scalable, reliable, more configurable (services across multiple machines (multi-tier) - in order to achieve faster response and load balancing),
G.3.10.4	Advanced Client side functionalities	Advanced client side functionality :Should support streaming vector data to a client Web browser & Android based browser. More functions, such as map rendering, spatial

	of Internet Mapping software	selection, and querying, should be done in the client Web browser without sending requests back to the server.

G.3.10.5	Integration of local & internet data	Should integrate Local and Internet Data.
G.3.10.6	Server architecture to be highly scalable	Highly Scalable Server Architecture: IMS should publish GIS services from a single server or distributes services across multiple servers, which provides for a highly efficient and scalable environment.
G.3.10.7	IMS capacity to function even if new servers are added or removed	The IMS should be specifically designed so that the site will continue to function while servers and services are added or removed. A site configuration should be able to save so that it will automatically restart the same configuration.
G.3.11	**PRINTING & PLOTTING**	
G.3.11.1	Printing Properties	Printing Properties : This module shall have the following printing facilities :
G.3.11.2		Print network vector map alone, raster map alone and network superimposed over raster.
G.3.11.3		The user should have the facility to print the features required by him.
G.3.11.4		The user shall have the capability to print the complete network or a part of the network in a given size of paper.
G.3.11.5		The user should be able to print complete or part of the network on given scale in multiple sheets of specified size.
G.3.11.6		The application should support print preview feature as well as various drivers.
G.3.11.7		The application supports PostScript.
G.3.11.8		The user should have the option for labeling specific or all the devices or objects of the network.
G.3.11.9	Plotting/ Printing of graphical areas	Plotting and Printing of graphical areas :The system should support WYSIWYG Plotting and Printing of graphical areas.
G.3.11.10		Legend, Texts styles in plotting template :Placement of Own Legend, various Texts styles in plotting template.
G.3.11.11		List the supported Plotters and Printers
G.3.11.12		The system must support :Map insets that allow the user to designate a portion of the map in a source frame and show a zoomed version of the source in a destination frame to

		enable printing and plotting cluttered areas.
G.3.11.13		The system should allow Generation of user defined Map grids, coordinate systems and preparation of Map-books

G.3.11.14		automatically. System should also allow scheduling of plotting activity. A map grid is a set of map sheets that can be plotted.
G.3.11.15		The application should provide users with the capability to store a map layout for consistent look and feel during map production.
G.3.11.16		The system shall support Map Production tools that allow users to create map books and map sets. It shall be possible to schedule the plot / print of the map books.
G.3.11.17		The map production system may automatically orient text (i.e. along the axis as opposed to horizontally).
G.3.11.18		The map production system plots labels for point, line and polygon features using any attribute (alpha or numeric). Labels are plotted in a variety of text fonts, sizes, colors and angles.
G.3.11.19		The system provides the functionality to automatically create titles, legends and other margin data and store them in templates that are transportable.
G.3.11.20		The map production system needs to be able to create markers and line sizes that vary automatically by the scale of the map.
G.3.11.21		The map production system allows the saving of layouts and or templates.
G.3.11.22		The Map production system includes the optional application of standard drawing frames and editable title blocks.
G.3.11.23		Storage of predefined templates for plotting
G.3.11.24		The system shall support Inset Frame tool that allows user to display specific features within current view individually in separate windows. For example, user can depict each switching facility in the Switching Facility layer in its own inset frame. These are to be plottable.
G.3.12	**REPORT GENERATION**	
G.3.12.1	REPORT GENERATION	This module shall have the facility to print and display the following reports :
G.3.12.2		Report of assets of complete network or a part of the network say Sub station, Feeder, Area etc.
G.3.12.3		Report showing number of objects for a particular symbol with different attribute data on the basis of selected attribute.
G.3.12.4		The system should support ability to create reports and report templates.

G.3.12.5		Bidder should list the report tools available with the proposed solution.
G.3.12.6		The system is capable of generating reports from the results of batch query sets.
G.3.12.7		The reports are user-format table and full-page when output to a printer.
G.3.12.8		Graphic reports can be generated from within the GIS applications software.
G.3.12.9		Wizard production of charts and reports in all user applications.
G.3.13	**ONLINE HELP & ONLINE TUTORIAL**	
G.3.13.1	Online help & online	The system should have the facility for online help context based and also on line tutorials.
G.3.13.2		A query builder to generate adhoc queries by user, who have no skills on SQL Commands, shall be provided.
G.3.13.3		Context based and user-friendly help should be available.
G.3.13.4		Help should be available at different level

3.3.8 Module 8: GIS based integrated network analysis module

Requirement ID	Functionality	Description
Na.1.0		**General features**
Na.1.1	Module capability	The module shall be able to perform several types of analyses on balanced or unbalanced three-phase, two- phase and single- phase systems that are operated in radial, looped, meshed or mixed configurations. The system shall be able to create "what- if" studies and performing simulations to evaluate the impact of modifications to existing network.
Na.1.2	Module features	The system shall have functionality for editing, querying and viewing the electrical system on a GIS base. Background maps showing city, streets, land parcels or annotations can be used to give context to the electrical network. It shall also be possible to trace and query the electrical connectivity of the system.
		The module should have the capability to perform the following broad functions related to distribution

		system design, analysis and optimization:
		i) Creation and editing of network,
		ii) Load flow and voltage drop analysis,
		iii) Optimization studies like capacitor placement, network

Na.1.3	Broad functionality	reconfiguration, conductor up-gradation, express feeder, load balancing and load allocation etc.
		iv) Creating extensive "what-if" studies.
		i) Fault analysis and protection coordination,
		ii) Network design reports, cost estimates, financial analysis,
		iii) Integration with New connection module for checking the network capability, augmentation requirement, if any
Na.1.4	Comprehensiv e package and integration with GIS	It shall be possible to do any number of studies either sequentially or at random. The package should be comprehensive, cover all aspects of analysis, optimization & designing and should be integrated with GIS package.
Na.1.5	Sharing of GIS database	The package should share the database of the GIS and should not require a separate database.
Na.1.6	Actual Mode & Analysis Mode	There should be separate modes to maintain organization precious data - Actual Mode or Real Mode and Analysis mode for any study.
Na.1.7	Actual Mode	Actual Mode or Real Mode must be the simulation of the network under subdivision. This type of study is useful for maintaining the real asset data and to view real network for planning purpose.
Na.1.8	Network in Actual Mode	In "actual mode" the network must be connected with subdivision working and updated regularly with the associated module. Any changes made to the system are recorded and can be further traced. Since its information is precious to organization and must be updated through proper channel (i.e. subdivision or office working).
Na.1.9	Editing in Actual Mode	In "actual mode" Cut, Paste, Save and Consumer shifting should be allowed but with proper check on user authenticity.
Na.1.10	Analysis Mode	An analysis mode of network will be such that whatever ad- hoc changes made to the network for analysis will not affect the actual "network/subdivision data", which represents actual network propriety of the organization.
Na.1.11	Editing in Analysis mode	In "Analysis mode" Cut, Paste and all editing options shall be allowed so that user can analyze the network with different configurations and modifications.

Na.1.12	System ability to analyze with part load on any feeder	A network / study can be opened (Loaded) either whole or in part i.e. user can specify the feeders or transformers to be loaded on network.
Na.1.13	Graphical representation and Mosaicing features	The software should provide for online graphical creation and editing of network topology and data. Mosaicking features for large networks shall be provided.
Na.1.14	Software ability to present tree	The software should be capable of presenting a tree view structure of the network- representing root at Sub- division/GSS
	view structure of network	and successive feeders/ transformers and LT circuits.
Na.1.15	Backup copy for network	There should be provision to make different backup copy for the network.
Na.1.16	Password protection for important editions	The software should provide a password protection on important issues like on deleting a study.
Na.1.17	System ability to export full or in part network	User can export whole or part of a network to a new study via selecting transformers and feeders.
Na.2.0		**Modeling capabilities of Network equipment's:**
Na.2.1	Software capability of modeling Electric Distribution Network	The software should be capable of representing (Modeling) an „Electric Distribution Network", which comprises of various electric equipment, connected from each other to generate a distribution system.
Na.2.2	Modular design with powerful tools and libraries	The software should be modular in design and should be combined with powerful tools, templates and libraries for easy input, updation and retrieval / sharing of data. The common database shall be available to all the users.
Na.2.3	Network creation with different	The software should provide tools for creation of 3/2/1 phase networks with different voltage levels with all its entities e.g., generator, bus, substation with different voltage grades, feeder, transformer,

	voltage levels and all entities	motor, capacitor, protective devices, lines with different size conductors and cables, loads, switches etc, with symbols and their technical data.
Na.2.4	SLD of network	The information in the system should be available as single line diagram of the network, schematic diagram of the substations with facility to access any or all of the information about equipment or network with zoom and pan facility.
Na.2.5	Indication of limitations	Any limitation regarding the number of nodes, buses, substations, feeders, number of balanced and unbalanced loads, branching on a circuit shall be clearly indicated.
Na.2.6	Modeling of loads	It should be possible to model the loads as constant power loads, constant impedance loads and constant current loads.
Na.2.7	Creation of user specific library of data	It should provide facility for expanding the standard library and also creating user specific library of symbols, design data, equipment data, operating limits and standards, cost data for equipment / material, cost data for power and energy losses and necessary data for carrying out economic analysis for the operating life time of the system.

Na.2.8	Network modeling of various electrical components	The module should allow network modeling with various types of · Transformers · Buses · Feeder as node · Section · Tap. · Circuit Breakers · Switches · Capacitors · Series Reactors · Boosters
Na.2.9	Network modeling with various electrical components & parameters	It should allow modeling the system for -Various Conductors (R, X&Amp. Capacity) - Various Distribution Transformer - Energy (kWh) - Various Loads (kW & KVAR) - Demand (kW & KVAR)
Na.2.10	Module validation capability	The module automatically checks and validates network topology and data for errors.
Na.2.11	Modeling with Power & Distribution transformers	The module should provide for accurate modeling of Substation as well as Distribution transformers. The software provides a separate canvas for drawing GSS equipment.
Na.2.12	Section representation in network	A section is represented in the network with a line from a possible parent node plus its physical structure.
Na.2.13	Representatio n of various types of sections	The software provides different shapes for different type of sections like - . Cut-Point . Double-Pole structure . Composite line . Composite double circuit . Double Supply Four Pole Structure . Six-pole structure
Na.2.14	Module ability to analyze „spot load“ on pole	There should be a BESCOM to add and analyze “Spot load” on pole itself.
Na.2.15	Module to display	The point from where the feeder starts has a

	feeder node"	visible interface i.e. the „Feeder node".
Na.2.16	Feeder installation restrictions	There should be restrictions that the feeder can be installed at either on a load bus of a grid substation or on the distribution transformer.
Na.3.0		**Analysis features -**
		The module should have following Analytical Capability-

Na.3.1	Analytical Modules	Balanced/Unbalanced load flow and drop voltage Analysis Fault Analysis (Symmetrical/ Unsymmetrical) Optimization of losses Capacitor Placement
Na.3.2	Analysis available through graphical interface	The following analysis results are to be available through graphical interface by “Point and Click” method. T & D Losses Analysis . Balanced Analysis . By-phase Analysis . Fault Analysis
Na.4.0		**Load Flow Analysis and voltage regulation -**
Na.4.1	Load Flow Analysis	The module must have balanced/Unbalanced voltage drops and load flow analysis.
Na.4.2	Ability to perform technical actions on network & analyze	User can perform various technical actions on network to have the changed statistics of load flow.
Na.4.3	Defining of LF, LLF	It should be possible to define/ evaluate annual load factor and loss load factor from the load duration details obtained from data acquisition system
Na.4.4	Peak power loss and energy loss in each section of Network	It should give the peak power loss and the energy loss in each line section and the transformation loss in each transformer. The iron losses and the copper losses (load losses) should be indicated separately. It should be possible to use the iron and copper loss values defined in user created library for the same
Na.4.5	Voltage and component wise segregation of losses	It should also be possible to segregate and get a summary of the losses voltage level wise and component wise for the entire network under study
Na.4.6	Load flow at varied tap & voltage	It should be possible to conduct load flow analysis for nominal voltages or user defined voltage. It should also be possible to conduct load flow analysis for different tap positions of the

	levels	transformers
Na.4.7	Indication of limit of violation	The load flow analysis should indicate violation of loading voltage and current limits
Na.4.8	Calculations according to various parameters	The calculation can be further filtered according to following parameters – a) Consumers category b) Diversity Factor of individual feeder. c) Inclusion of only 3 Phase load (exclusion of single phase load) d) Set load according to each LT Feeder, Peak loading, average loading e) Set Load according to the DTC full load, part load, average loading
		The module should allow Allocation of Load by substation

Na.4.9	Load calculations	demand by – Dividing load in proportion to connected kVA and Dividing load in proportion to KWH Include spot loads
Na.4.10	Demand calculations	The module can calculate and allocate the Substation Demand among the feeders based on- . - kVA and PF - kW and PF - kVAR and PF - kWH, Load Factor and PF - Amps, kVA and PF - kW and kVAR - Diversity factor
Na.4.11	Load Allocation	The module must provide facilities for Allocation of Load by Feeder Demand, DT demand, pf etc from the meter database. Divide Load in proportion to KWH / connected KW kWh parameter shall be updated regularly by subdivision working. New load (consumer) added in the subdivision is automatically taken into account in load flow calculations.
Na.5.0		**Optimization Studies -**
Na.5.1	Ability to support sub-station proposal	Software shall support Power/ Distribution substation proposal
Na.5.2	Design of support strength, clearances etc.	It should be possible to evaluate the design of distribution feeders to check adequacy of support strength and statutory clearances etc.
Na.5.3	Earthing design	It should be possible to evaluate the design of earth mats and earth electrodes.
Na.5.4	Ability to support power transformer proposal	It should be possible to determine the number, location and size of primary substations required to meet the growing demand at minimum total cost.
Na.5.5	Ability to support Distribution transformer proposal	It shall be possible to generate optimum distribution transformer proposal, new or augmentation over a selected regions or nodes.
	Solutions for line	It should be possible to determine the optimum network configuration for formation of new links

Na.5.6	overloading etc	to nodes on a existing feeder, tie points for changing feed area from one substation to another to balance load among substations
Na.5.7	Creation of express feeder	It should propose an express feeder in order to overcome irregular overloading of a feeder, to remove or reduce the Low Voltage Area and to minimize line losses.
Na.5.8	Economic and break-even loading limits	It should be possible to determine the economic and break-even loading limits of conductors and cables.
Na.5.9	Solutions for conductor problems	The software can propose a new conductor over the over loaded regions on a feeder to remove/minimize the over loaded region by suggesting better conductor on the network.

Na.5.10	Load Balancing Analysis	The software should provide load-balancing analysis to minimize losses.
Na.5.11	Phase change proposal for loads	The system suggests consumers re-phasing for minimum losses.
Na.5.12	Technical and commercial feasibility due to any change	Software should provide the technical and commercial feasibility of any technical modification done by user. Such feasibility report shall include the following details. New proposal will be reflected with different line color and style.
Na.5.13	Feasibility Report Contents	a) The feeder statistics like length, power losses, max voltage drop, power factor, max current etc. as per the requirement before and after the proposal. b) List, location, and details of equipment installed and actions performed. c) List of equipment uninstalled due to replacement d) Approximate cost of equipment installed and depreciated cost of equipment uninstalled. e) Technical feasibility of the proposal. f) Commercial feasibility of the proposal. g) Pay back period of the proposal
Na.5.14	Network analysis based on certain practical constraints	Such summarized analysis can be made more practical further by putting following constraints - a. Fixing minimum limit for new transformer proposed. Available conductor. b. To select only those feeders where VR is above some specified limit. c. To select only those transformers, where overloading is above some specified limit. d. Limit can be fixed for minimum payback period of each unit of proposals
Na.5.15	Connection feasibility for new application	The consumer applications for new connections, load extension etc. shall be processed to generate connection feasibility report.

Na.5.16	Contents of connection feasibility sheet	The Connection feasibility report shall include mainly the following details – a. The Feeder/Transformer statistics like max voltage drop, max current etc before and after the proposal. b. Suggested phase and technical details from tail end to source end of the feeder subjected. c. List of equipment to be installed/uninstalled and technical actions to be taken before release of new connection or load extension. d. Final suggestion for new connection like connection can be released or not.
Na.5.17	Check for non bypass of processes of new	This application processing is bound to further processing. For example, if user tries to bypass the process then he can’t generate the SCO or RCO etc.

	connections	
Na.5.18	Network updating on the basis of actual jobs done	The actual network updating can be bound to job order process in order to update the original changes to network.
Na.5.19	Calculation of Technical losses in the network	The network analysis module shall be able to calculate the allowable as well as actual technical losses based upon the power flow data in any part of the network by linking with the meter data acquisition system and asset mapping database. The result of technical loss analysis shall be used by Energy Audit module to generate detail Energy accounting and Audit reports as described in detail in separate module of "Energy Audit".
Na.5.20	Boundary Condition Conflict resolution through module	The package provides proper mechanism to solve boundary conditions conflicts of subdivisions
Na.6.0		**Fault Analysis -**
Na.6.1	Short circuit analysis feature	The software should provide following short circuit analysis.
		- LL
		- LLG
		- SLG
		- 3 phase
Na.6.2	Short circuit module capability	The short circuit module shall provide values for fault currents for different types of fault and also gives the fault voltage and impedance analysis throughout the network taking into account pre-fault loading condition . A user shall specify any point in the system and the analysis will return fault values for all points downstream. This helps to determine fault values for entire feeders if required.
Na.6.3	Short circuit analysis algorithm	The analysis algorithm shall take into account any closed loops in the distribution system and also for the fault in feeds from embedded generation and large motors throughout the system.
Na.7.0		**"What if " studies -**

Na.7.1	„What If" scenario on certain parameters	The software should provide extensive "what if" scenario on following parameters -
		- Connected load
		- Line Configuration
		- Distance
		- Conductor/Cable
Na.8.0		**User level customization features**
Na.8.1	Line parameter customization	User can customize the line color, width, style for voltage levels according to his requirements.
Na.8.2	Equipment Color customization	User can customize the equipment color according to his requirements.
Na.8.3	Background	User can customize the background color, display of analysis

	Color customization	results and input data information.
Na.8.4	Text customization	User-defined text and other labels can be changed for following properties :- - Font Name - Font Size - Font Color - Font Style
Na.8.5	Color assigning for a circuit	One can assign a circuit/ feeder a distinguishable color permanently.
Na.8.6	Color Editing of feeder	The standard color for a feeder can be attained again if required.
Na.8.7	Overloaded equipment representation	User can see the overloaded equipment as blinking with overloaded color.
Na.8.8	Complaint Affected node representation	The user must have a facility to view complaints affected nodes with different color.
Na.8.9	Label Hiding	Labels loaded on the network can be made invisible if required.
Na.8.10	Change of parameters like tariff of energy	Important parameters like tariff of energy (in Rupees per unit) can be changed.
Na.8.11	Unit system	The unit system for various parameters envisaged shall be in SI (Metric) units and cost in Indian Rupees.
Na.8.12	Fixing voltage limits	User can fix the limit of Over Volt and Under Volt conditions (Voltage Regulation) according to the organization regulations.
Na.8.13	Storage of Load Flow Statistics	User can store load flow statistics with different name and reload them when required further.
Na.8.14	Unit Allocation for capacitance value	User can fix the unit of capacitance with which the system gives the capacitor proposal.

Na.8.15	Section Unit allocation	User can fix the unit of section installed by the system according to different voltage levels and pole type like cut point, double circuit etc.
Na.9.0		**Help/Search/Display Features**
Na.9. 1	„Help“ features in software	The software should contain varied range of tool tip help, with important parameters/ attributes can be seen with balloon help.
Na.9. 2	Attributes on balloon help	Specifically it should provide following attributes on balloon help on proper node -No of Consumers on a node -Distance of this node from source. -Load at the pole of different phases R, B, Y. -Current:- Individual and all 3 phases - Voltage regulation: Individual and all 3 phases current

Na.9.3	Balloon help to be node specific	The balloon help must be specific to the type of node.
Na.9.4	Source trace & ability through node	A source can be traced from the node selected showing it with a different line color.
Na.9. 5	View/Print Option wrt nodes	It should provide following views and prints. - Remove all nodes upwards. - Remove all nodes downwards. - Show All Nodes downward - Show All Nodes
Na.9.6	Node inclusion in „View Changes“	These “view changes” must not exclude the nodes from calculations.
Na.9.7	Easy Interface for network traversing	The network traversing is provided with easy interface like “dragging the canvas”.
Na.9.8	Network Traversing by Keyboard	The network can also be traversed by keyboard from the selected node in upward and downward directions.
Na.9. 9	Provision for Toolbar removal when not required	The toolbars can be removed from screen when not required.
Na.9.10	Filtered search for node tracing	The node searching should be provided with systematically filtered search.
Na.9. 11	Node Search Support Logic	The node search support global as well as Feeder ID/Feeder Name/Transformer ID/Transformer Name/ Absolute ID oriented search.
Na.9. 12	Node search on basis of customer information	A node can be searched for a consumer if consumer information is provided like Service No. / Account No. etc.
	System ability to	A particular or whole network can be set to show

Na.9.13	show particular type of nodes only	only junction and terminal nodes while excluding carry nodes.
Na.9.14	Drawing formats in syste m	Supports shp, dwg etc. drawing formats.
Na.9.15	Insertion of GIS layers in network	Number of GIS Layers can be inserted in the network with electrical layer superimposing rest all the layer.
Na.9.16	Represent atio n of different voltage levels in different layers	The application shall facilitate a network to be entered in several different layers. User can have different view of Layers like 33KV, 11KV, LT layers etc.
Na.9.17	map	data analysis shall be done on various functions such as commercial functions, billing demand, defaulter concentrations,

		no of new connections, load & energy balance etc.
Na.9.18	System permissibility for customization of graphical representation for each entities	System allows the user to customize and insert the graphical elements in the network to represent for each of entities/objects/elements. · Point · Line · Polygon · Text · Color · Hash pattern · Line style · Font . Point shape (Round, square, user defined..)
Na.9.19	User ability to dynamically select object attributes	User can dynamically select one or more of the attributes of an object, to be displayed as label or Tool Tip of the object. This can be for viewing, plotting and printing purposes.
		-System supports representation of the structure/object/elements in different colors based on the certain attribute criterion
		-User can display the different layers with different scales.
		-The software should have dimensioning capabilities.
		-The system gives the real time measurement / length, while drawing the sections.
Na.9. 20	System improvement proposals generated by system	The system improvement proposals generated by the application are not only on cost effective aspects but also involves GIS enabled logic like shortest route technically feasible.
Na.9. 21	Feature to tag as existing, new or proposed	The program should provide for feature to tag/identify/code the equipment / network component as existing, new , proposed etc.
Na.9. 22	Pan/ zoom features	Shall control the display of the data on the screen and allow the user to refresh, pan, zoom in, zoom out, zoom to preset scales etc.
Na.10. 0		**Editing Features**
Na.10. 1	Controlled Editing of	It should provide restrictions on all edits modifications on the network including adding/editing equipment on the network.

	network	
Na.10. 2	Locking facility for system studies	It must provide a facility for a super user to lock some particular studies or backup safe from others via password protection.
Na.10.3	Entry of probable/ default value	For ease of data entry, every probable or default value should be entered implicitly.
Na.10.4	User permission to change supply	User can change the supply shifting/change in the network.
Na.10.5	Mapping composite nodes	It can properly map composite nodes as one node same time treating them with different lines equipment as well as maintaining the inventory.
	Software	The software has facility to put geographical labels as well as

Na.10.6	facility for geographic & equipment attribute labels	equipment attribute labels on study.
Na.10.7	Label Dedication	These labels can be dedicated to a feeder alone.
Na.10.8	Multiple Node Selection	The software shall allow multiple nodes selection.
Na.10.9	Mapping of new nodes with different lines/ colors	The nodes added at the time of proposals or estimate should be mapped with dash or different line color/node- id to distinguish them from persistent nodes.
Na.10.10	Provision remove temporary equipment	There must be provisions to remove such temporary equipment automatically as well as forced.
Na.10. 11	Selecting/ Deselecting node	Any node selected can be deselected deliberately.
Na.11.0	Querying & Reporting facility	Querying and Reporting facility :Other than analyses, software should provide following querying and reporting facility
Na.11. 1	Querying Reporting „Sections“	Section - a) Section parameters individual. b) Section consumer detailed/Individual.
Na.11. 2	Querying Reporting „Feeders“	Feeder - a) Feeder parameters individual. b) Feeder parameter detailed. c) Feeder parameter summery d) Circuit parameters Graph. - Distance V/s Pole - Current V/s Load - Power losses e) Consumers reports f) Consumer service lines losses detailed
Na.11. 3	Querying & Reporting on „Transform	Transformer - a) Transformer parameters individual Static. b) Transformer parameters individual

	ers “	(dynamic) c) Consumers reports (User filtered/customized)
Na.11. 4	Querying & Reporting on „Sub-station s“	Substation - a) Substation design print schematic b) Substation inventory summery c) Subdivision level consumers report (User filtered/customized
Na.12.0		**Printing and Plotting**

Na.12. 1	Network Printout from tree view	It should provide facility to view and print Network directly from tree view of the network without actually loading the study as :- a) LT Maps only b) LT Maps with 11 KV c) 11 KV Map with LT d) 11 KV Map e) Whole study Map
Na.12. 2	Generation of various summary / individual reports	There should be facility for generation of various summary / individual reports for example feeder wise, transformer wise, voltage level wise, zone/area wise, consumer category wise etc.
Na.12.3	Abnormal condition reports	Abnormal condition reports for sections with voltage violations and / or over loads.
Na.12.4	Saving of reports	The user can save reports, information (Tabular/Graphical /non-graphical) to file/printer/ terminal.
Na.12.5	User Text printing along with selected network	The comments/user text can be printed along with the selected graphs and network diagrams.
Na.12.6	Saving in different formats	There should be facility for importing Single line diagrams and reports to industry standard packages like Microsoft Word, Microsoft Excel etc.
Na.13. 0		**Cost Estimating -**
Na.13. 1	Preparation of cost estimates as per cost data	The module should be capable of preparing cost estimates of lines, substations etc. based on the cost data.
Na.13. 2	Provisions to input special and customized cost data	There should be provision for users to input customized costs for special structures like river crossings, railway crossings. There should also be provision to input the cost data of storing the material and associated equipment, erection charges, other standard and non- standard estimate components.
Na.13.3	Estimated for several lines and sub stations	The module should be capable of preparing project estimates consisting of several lines and substations.

Na.13.4	Storage of cost data of several areas and multiple versions	There should be facility to store the cost data of several areas and more than one version of the project report.
Na.13. 5	Automatic capturing of works proposed and creation of cost estimates	The module should be capable of capturing the works proposed under various studies and creating the estimates of the studies performed by transferring the initial works proposed in the studies without again entering those details.

Na.16. 0		Financial Analysis
Na.16.1	Module for cost benefit analysis	For providing the commercial feasibility of any technical modification proposed, the software should have module for cost benefit analysis of any network under various proposed alternatives.
Na.16.2	Provision for cost depreciation	The proposal shall also include the depreciation of “Item recovered”.
Na.16. 3	Cost calculations for various options	The module should provide for evaluation of project and cost calculations for various system improvement options proposed.
Na.16. 4	Calculation of various financial parameters	It should be able to calculate the financial parameters such as internal rate of return, payback period, sensitivity analysis etc. so as to optimize the investment for an electrical distribution system.
Na.16. 5	Provision of optimal solution	Module should also give the optimal solution for any given network and shall have provisions for minimization of losses so as to maximize the net benefit i.e., the present worth of loss reduction is more than the annual cost of capital investment

3.3.9 Management Information System(MIS)

Overview: Generation day to day MIS reports including disconnection (single and bulk in various hierarchy) and reconnection reports (single and bulk in various hierarchy), Energy Audit reports, DCB Report (daily, weekly, monthly and between dates/specific period), Cash reports shall be carried out at Sub-Division Office or at any different level of the offices of BESCOM.

Requirement ID	Functionality	Description
Mis.1	Generation and maintenance of various MIS reports	The specification covers maintenance and generation of various management information reports required for top management, middle level management and respective unit offices. These are generally based on the data generated under different other packages covered in this section. The MIS Module should include Information capturing, Information processing, Information management, Information

		based decision-making & reporting.
Mis.2	Study of existing business process to finalize MIS formats	Before finalization of MIS requirement and formats, at through study of the existing business process shall be carried out along with BESCOM. Based on The organization structure and requirement of decision support system at organization level, ac comprehensive MIS requirement document shall be prepared. The actual MIS requirement shall be finalized at implementation Stage.

<table>
<tr><td>Mis.3</td><td>Provision to generate MIS on regular basis</td><td colspan="4">The system should able to generate reports on regular basis. BESCOM will finalize the periodicity and the format of report.</td></tr>
<tr><td>Mis.4</td><td>Creation of different formats for different level</td><td colspan="4">The format for same report prepared for different levels will be different, e.g. Monthly collection report for SDO, Circle, Zone & Corporate office may be different.</td></tr>
<tr><td>Mis.5</td><td>Elimination of human intervention in data acquisition</td><td colspan="4">Data acquisition for MIS should preferably be without human intervention as far as possible. The data should be collected only at the lowest level and from the same source and in the standard formats.</td></tr>
<tr><td>Mis.6</td><td>Provision to generate MIS reports for external agencies</td><td colspan="4">MIS reports are also to be generated for external agencies such as regulatory Commission. The Formats for such reports are different based on the specific requirement of KERC. The formats and the periodicity of the same will be finalized with BESCOM.</td></tr>
<tr><td rowspan="5">Mis.7</td><td rowspan="5">Type and periodicity of reports</td><td colspan="4">Type of report and periodicity of such reports given below are indicative only and final requirement will be spelt out by BESCOM as per requirement:</td></tr>
<tr><td>Type:</td><td>Lower level</td><td>Middle level</td><td>Top level</td></tr>
<tr><td>Financial</td><td>Daily</td><td>Daily / weekly/ monthly</td><td>Monthly / quarterly / yearly</td></tr>
<tr><td>Operational Efficiency</td><td>Daily / weekly</td><td>Daily / weekly / monthly</td><td>Monthly / quarterly / yearly</td></tr>
<tr><td>Customer Satisfaction</td><td>weekly</td><td>Weekly/ monthly</td><td>Monthly / quarterly</td></tr>
</table>

					/ yearly
Mis.8	Provision of monitoring system	This module should also provide monitoring system for - Revenue monitoring and Reconciliation monitoring (based on billing backup data & bank reconciliation and cash collection data) Grievances & Public representation Legal Cases Vigilance, Theft & embezzlement cases Reconciliation of consumer wise opening & closing balances QTR & Year wise will also be required			
Mis.9	Provision of Business Intelligence Tools	This module should provide Business Intelligence Tools for data mining, analysis, trending, simulation etc.			

Mis.10	Provision to generate reports for all modules in user defined formats	The system shall generate reports for all the modules in user-defined formats. The system will have a graphical user interface with a capability for generating customized reports, apart from the regular ones mentioned above, as per the requirement of management and operations staff. Display of statistical data shall be presented additionally in graphical formats such as bar-graph/pie diagram etc. for convenience of analysis.

3.3.9.1 Special Features of the Software:

i. To consolidate all R-APDRP MBC module reports with Non-RAPDRP reports including DCB and furnish consolidated MIS reports/Dash board / Analytics to the Company.

ii. Multi-Language Support – All reports shall be available in both Kannada and English.

iii. SMS and E-Mail Notifications/alerts- daily updates to all Management levels. Billing, payment, ECS, Disconnection/Reconnection and Cheque dishonor etc., alerts to Consumers. SMS gateway charges are to be borne by the Successful Bidder.

iv. Security and Authentication – Biometric based authentication shall be provided for all cash counters, users at SDO / Division/Circle/Zone/Corporate, Accounting level and for all the SBD users.

v. The database should be maintained with high security and absolute integrity with access and changes permitted strictly as per BESCOM Policy based on fingerprint-based authentication.

3.3.10 Web Self Service

Objective : The goal is to provide a high quality experience for the customers and business associates that will provide them a user friendly portal that will make it easy for them to communicate with BESCOM though the web instead of direct phone calls or visits. This portal will also act as a source of information for the customers regarding policies and procedures. This in turn will improve customer satisfaction and reduce work load on the employees. The functionalities mentioned hereunder must be also available on Mobile App to be developed for consumers.

Requirement ID	Functionality	Description
wss.1	Home	This page provides a brief description about the site, the various functionalities it provides and promotional features or any kind of advertisement for special programs can be placed in this page. Login Component is provided and registered users may login using their username and password. New Users can also register by clicking on the First Time Users Register link. The Forgot Password link helps the user to retrieve their password.
wss.2	Log In	The Log In page asks the registered users for their username and password while the new members can also register through this page.
wss.3	Registration	The user is asked for personal, security and account information in this page before registering.
wss.4	Forgot Password	The user is asked for his first name, last name, zip code, birthday and his primary email address before being provided with the security question.
wss.5	Security Question Answer	The new password is sent to the user by email (his primary email address as in his profile) on answering the question correctly.
wss.6	Change Password	Once the user has logged in, he can change his credentials i.e. Username and Password by clicking on the Change Credentials link
wss.7	My Accounts	This is the landing page for the users with multiple accounts. The screen contains a brief summary of all the accounts such as the account name, address, balance, due date and the account status.
wss.8	Single Account	This is the landing page for the customers. The screen contains a description of the account. Any status messages pertaining to the account involving immediate user action is also presented here.
wss.9	Consumption History	The page provides an account of the usage for the last 12 months graphically. A more detailed analysis is provided in a tabular format listing the meter reading date, the reading, consumption,

		number of days, charges etc.
wss.10	Consumption Calculator	The consumption calculator popup is provided to help the user calculate the usage between any two given dates.
wss.11	Bill Summary	The Bill Summary page gives a record of the Billing amounts and Payments made by the customer over the last few months.
wss.12	Online Billing Registration	The user is provided with the options of registering in Online Billing and also continues with paper bills.
wss.13	View and Pay Bill	The View and Pay Bill page presents a short summary of the bill. The user can also view the bill in PDF format by clicking on the link „View Bill as PDF“.
wss.14	Pay Bill	The user is provided with 2 modes of payment namely Credit Card and Debit card On providing the valid credentials payment can be made directly from the site. The online payment shall be processed through secured payment gateways
wss.15	Multiple Pay Bill	Payments for all the accounts can be directly made from this page. For each of the account the user is provided with 2 modes of payment namely Credit Card and Debit card. On providing the valid credentials payment can be made from the site directly.
wss.16	Manage Accounts	The page lists all the accounts for the user and the preferences for the accounts.
wss.17	Service Requests	This page allows customer to lodge request for services such as new connection, disconnection, load change, name change, category change, meter shifting etc. Depending on the regulatory/ BESCOM, user is required to submit the documents.
wss.18	Service Request Status	This is a read only screen which the user can view. Status of various pending requests for the customer such as load change, name change, category change, meter shifting etc are listed here.
wss.19	Complain	Under this page user can log his complaint using a drop-down menu and also enter some text.
wss.20	Complaint Status	This is a read only screen in which user can view the complaint status.

wss.21	Report Power Failure	This screen contains static data related to the power failure. The contact number is mentioned in case any power failure occurs. The user calls up the number and reports the power failure and necessary action is taken to restore the Power connection.
wss.22	Report Street Light Outage	This screen allows the user to report any street light outage incident. The user has to fill up the specific information provided in the screen in order to locate the street light and then report it.
wss.23	Update Profile	This screen enables the user to update his/her profile information. The user can edit the personal information and click on Update Changes button to save those changes.
wss.24	Commercial Information	This screen displays the applicable policies, acts and rules prescribed by BESCOM, regulator and the law, which are helpful for customers.
wss.25	Associated Sites	This screen provides the link to all the associated sites such as KERC., Ministry of Power etc.
wss.26	Contact Us	This screen displays the information of the contact persons, who should be contacted for any information or for providing any feedback.
wss.27	Privacy Policy	This screen shows the different privacy policies to which the web site adheres. This screen displays only static content. The user can navigate to other pages by clicking on the bread crumb or the left navigation.
wss.28	Business Associate	This screen enables business associates (contractors) to register online, view tenders, purchase tenders, submit tenders, etc.

3.3.11 METER DATA MANAGEMENT SYSTEM

It is the heart of AMI. MDMS shall be a single repository of all meter data. The bidder shall design this system based on open standards and using SOA principals. It will facilitate the following:

Basic Features

The Meter Data Management System supports storage, archiving, retrieval & analysis of meter data and various other MIS along with validation & verification algorithms. It acts as a central data repository. MDM shall have capability to import raw or validated data in defined

formats and export the processed and validated data to various other systems sources and services in the agreed format. It can provide validated data for upstream systems such as billing, consumer Information system, customer care, analytics, reporting, Network planning & analysis, load analysis/forecasting, Outage management etc.

Asset Management:

- Maintains information and relationships between the current installed meter location (apartment, shop, industry/ address etc.), Consumer information (Name etc.),Consumer account no, Meter ID, Type of Meter (type of consumer, 1 phase/3phase, with or without relay, etc.), Meter configuration (Demand integration period, Load profile capture period etc.), GIS supplied information (longitude, latitude, connection with feeder/ transformer/ pole etc.) etc.
- Support tracking the status of meters and communication equipment from the date when they are installed in the field. The history of in-service asset location is maintained throughout the device life with start and end dates associated with each in-service location reference.
- Ability to report and log any damage / deterioration in the meter attributable to consumer/utility.

AMI Installation Support:

- The MDM shall support device lifecycle management from device registration, installation, provisioning, operations and maintenance to decommissioning etc. The MDM generates exceptions for smart meter not delivering the correct meter data after installation.
- The MDM provides a reconciliation report that identifies the meters that have been installed but not communicating for a designated period. MDM generates reports on the number of meters installed in comparison to the number of meters successfully communicating.

Meter Data:

- The MDM accept input, process, store, and analyse Meter data from HES and meter data collected through hand held meter reading instruments and manual meter reads. In case of manual reads, provision should be there to insert associated notes like assessed energy, etc.
- It accepts input, process, store, and analyse non-billing meter data such as voltage and power quality data (like under/over voltage etc.) as they are available from AMI Head End Systems. The MDM should also support schedule and on-demand meter reads and pinging of meter energized states by authorized users and by other utility systems.
- It shall provide storage of all collected Meter Data, events and alarm for 5 years or more via archiving.
- Correctly track & resolve energy usage across meter changes with no loss of individual meter data.
- Provide complete history and audit trail for all data collected from meters including commands sent to meters and other devices for

minimum 30 days.

- Execute on-demand read processes.
- Handle special metering configurations like net metering/multiple meters at same premises.
- It should have the ability to manage a minimum 15-minute interval data.
- Data Integrity- AMI Implementing Agency (AIA) shall ensure data integrity checks on all metered data received from data collection systems.

Data Validation, Estimation, and Editing (VEE):

- The validation and estimation of metered data is based on standard estimation methods. The MDM supports and maintains the following data:
  - **Registered Read Data** including register reads, daily billing cycle, as well as derived billing determinants like TOU.
  - **Interval Data** channels with variable intervals and variable units of measure
  - **Calculated data** that is derived or computed such as billing determinants and aggregated loads.
  - **Event data** storage of all collected event and alarm data from meters, network equipment, and MDMS itself.

- MDM shall flag, alarm and trigger an estimating process including but not limited to when the following anomalies occur in the cumulative register reads
  - CUM Decrements within a billing cycle (except net-metering)
  - CUM reads increments more than configurable threshold

- Future or old read dates
- Number of digits exceeds number of meter dials
- MDM shall detect, flag, alarm and trigger an estimating process including but not limited to when the following anomalies occur in Time of Use (TOU) register reads
  - **Register Decrements (except net-metering)**
  - **Resets (to zero) (except net-metering)**
  - **CUM reads increments more than configurable threshold**
  - **Future or old read dates**
  - **Erratic compared to CUM read (sum of TOU reads minus CUM read)**

- MDM shall detect, flag, alarm and trigger an estimating process including but not limited to when the following anomalies occur in Demand register reads
  - Do not reset on cycle
  - Do not reset coincident with customer move-out or move-in
  - Reset off cycle inappropriately
  - Too high

- The MDM shall maintain both the original received raw data in a non-manipulated state, in addition to VEE data.

- Notwithstanding the latency of data collection via the AMI system, once the MDM receives meter read data, the VEE process occurs in real-time and the post-VEE data is then immediately available to user or external systems.
- The MDM shall be able to automatically flag data changes from manual edits, VEE (Validating, Editing and Estimating) rules and data source corrections and electronically generate audit trail with timestamps and user-ids.

Billing Determinants Calculations:

- It allows configuring multiple TOU/TOD options (e.g. the number and duration of TOU rate periods) by customer type, tariffs and day type (weekend, weekdays, and holidays) and by season.
- Supports the processing of interval data into billing determinants to include the following at a minimum:
  - o Total Consumption
  - o Consumption in different time blocks for ToU billing
  - o Maximum Demand (in kW and kVA)
  - o Number of tamper counts
  - o Average power factor
  - o Processes interval data and frame, it into the appropriate TOU periods for consumption and demand; for example, roll up 15/30-minute data intervals into hourly data.
- Ability to properly account for special metering situations such as check metering, sub metering, prepaid metering and net metering when calculating billing determinants and sending them to billing and other systems.

Exception Management:

- Ability to capture and log data exceptions, problems and failures and to generate management reports, provide trend analysis, automate generation of service requests and track corrective actions.
- Ability to group, prioritize, filter and send system generated alarms and events to predetermined email addresses, cellular text messages to phone numbers/SMS/customer care etc.
- Exception Generation - Generates exceptions based on configurable business rules including but not limited to the following:
  - o Meter tamper alerts
  - o Communication module health alerts for Meter/ DCU
  - o If the consumption is less/more than pre-defined average consumption
  - o Negative Consumption (not for net-metering)
  - o Power outage indications received from the Smart meter

Service Orders:

- Generates service orders based on configurable rules for various events and alarms such as stop meter, tampers, problem in communication networks, AMI host server, etc.
- Sends service orders via SMS, email, etc. with the email addresses / phone numbers being configurable. MDM shall receive feedback on action taken on the service order and track the status of service orders.

Customer Service Support:

- Provides customers with access to current and historical consumption and interval data, outage flags, voltage and power quality indications in graphical and tabular form depending on user choice. The Customer may also access data through customer portal. The solution shall integrate via a user friendly graphical interface.
- MDM supports email/SMS notification of configured alarms & events to configured users.
- The MDM is a web portal and have the ability to interface with the 3rd party portal/utility portal to provide the consumer near real time online views of both usage and cost and helping consumers to understand electricity usage and cost information, alerts and notifications and energy savings tips with different levels of detail. The portal also enables the user to view the past electricity usage, last week's, yesterday's, current days or other period etc. as preselection. The portal should provide user friendly access to consumer for their data via colorful graphs and charts.
- Shall support mobile app through which consumer shall be able to log in through android/iOS based mobile app to see information related to his energy consumption.

Analysis:

- The MDM shall have the capability of configuring business rules including but not limited to the following:
  - o Display consumption/load profiles by configurable period (15/30 min, hour, day, month, year etc.) day type (weekday, weekend, holiday, festival wise etc.) and by tariff, customer type, or any user specified collection of meters.
  - o Generate peak & off-peak load patterns by aggregating all loads of DT/Feeder/consumer group.
  - o Provide the data to load forecasting, load research or demand response applications and perform error management like: Missed reads and intermittent meter reads before taking into forecasting, load research or demand response
- Ability to configure the system to effectively visualize consumption trends, identify unusual patterns, and visualize load analysis to understand which assets are being over utilized
- Analysing data to identify new patterns of usage, transformer overload alerts /demand– supply gap alert etc.
- Ability to receive and store outage and restoration event data from smart meters and outage systems and to log all such events for analysis.
- MDM including but not limited to following: o Daily data collection report
  - o Usage exceptions
  - o VEE validation failures
  - o Missing interval Read date and times (on hourly, daily, weekly & monthly basis)
  - o Physical meter events (install, remove, connect, disconnect) & meter

reset report
- Meter flags
- Meter inventory
- Defective meters
- AMI performance measurements
- Threshold Exception

- All MDM reports are in standard digital format such as PDF, Excel etc.
- Ability for GUI (Graphical User Interface) to set up or change report delivery to configurable email addresses, network file directories, ftp sites or printer systems without modifying source program code and without any proprietary language skills.
- All queries can be generated through user driven drop down menu in GUI. The Bidder shall provide example queries to support internal report generation needs.
- Ability to provide daily & weekly interface exception reports between MDM and other subsystems e.g. billing, outage etc.
- In case more than one technology of AMI (example GPRS and RF between Smart Meter & DCU) deployed in the field The MDM shall generate report on the performance and availability of data being delivered per AMI technology.
- Monitoring of Sanctioned Load versus Maximum Demand for consumers
- Reporting of Nodes with regular communication failures or where communication success rate is below a user defined value
- Dashboard for daily / monthly monitoring by Management
- Supply variation for consumers with respect to other consumers.

Revenue Protection Support:
- Ability to analyse meter tampering flags, power outages, usage trends and usage profiles to identify potential energy diversion situations, and produce daily reports, monthly reports and service order requests for investigation.
- The business rules for revenue protection alerts are configurable via user-friendly interface.
- Can filter out revenue protection alerts that may be caused by field activities if the field activity information is provided to the MDM.
- Support the analytics/investigation (i.e. view current and historical usage patterns) to valid suspected revenue protection issues.

Demand Control/Demand Response Support:
Bidder shall describe how its MDM supports Smart Grid Demand Response programs involving Demand Response (DR) systems as part of PLM. The solution shall support the following analysis:

- Totaling the actual consumption during the DR event.
- Totaling the actual consumption of different groups that participated in the DR event.
- Comparing the actual to baseline consumption for the groups in above.
- The MDM shall support the tracking, monitoring and managing of Smart Meter and events, and monitors customer response to facilitate payment of customer incentives.

OMS/ other smart grid functionality support:

- MDM shall support Smart Grid OMS system as per the requirement of the utility.
- MDM shall support the interfacing with OMS software for providing AMI meter data needed for fault location identification and other requisite services like updating the data after attending the fault etc.
- MDM should also support the interfacing of other smart grid functionalities like Distribution Transformer Health Monitoring system, self-healing system, electric vehicle etc. as and when implemented by the utility.

Net Metering / Gross Metering:

- MDM flags, alarm and trigger an estimating process including but not limited to when the following anomalies occur:
  - o CUM decrements of forward energy within a billing cycle
  - o Register decrements for Time of Use (ToU) of forward energy
  - o Power generated(exported) by any net-metering consumer more than the installed capacity of solar PV rooftop system
  - o Energy exported(exported) in any given day by any net-metering consumer more than the programmable threshold value

Prepaid metering:

- The prepaid functionality can either be availed at smart meter level or through MDM. In case of MDM, following are the features
- The MDM supports pre-payment metering and capability to interface with pre-payment application.
- Payment and connection parameters are stored centrally and the details are being updated to consumer portal/app.
- The system periodically monitors the energy consumption of prepaid consumer and decrease the available credit based on consumption.
- The system sends connect/disconnect command on the basis of available credit as per notified rules &regulations.
- System sends low-credit notifications to the consumer when their balance approaches a threshold.

USER INTERFACE

The AMI Implementing Agency (AIA) shall provide user interface for the following Utility

- User interface for utility shall have ability for at least the following functionality:
- Compare total energy costs on one rate schedule vs. one or many alternative rates.
- Enable the user to see how different options within a rate affect costs.
- Enable the user to see how adjusting load or consumption levels or shifting them to different time periods influences costs.
- Compare multiple facilities against each other based on costs, average spend, cost per area and cost by weather.
- Display meter data at a user defined configurable cycle through a

GUI that allows

authorized users to view energy usage patterns and the data behind them for selected customers.

- Allow authorized users to view metered data, initiate and view reports, modify configurations, and initiate and update service requests via a GUI.
- Display via a GUI the energy usage profile for a single meter or group of meters. The load profile shall illustrate energy consumption and peak demand in user defined intervals for a user-specified time period.
- Display via a GUI the energy usage profile for a single meter or group of meters according to Time of Use (ToU) tariff.
- Access to a minimum of 5 years of historical energy usage and meter reads through the GUI.
- GUI to clearly and visually distinguish between metered, estimated, allocated and substituted data.
- GUI to provide role-based access based on user identity and user role.
- Shall have following types of users: o Administrator
  o Operator
  o Field staff
  o Viewer/Guest
- Configure the look, feel, and functionality of the MDM in accordance with business needs, business processes, and business conventions. (E.g. GUI, content, look and feel of screens, validation rules, exception handling, etc.).
- Ability for utility through user interface to set up alarm and event notifications that can be directed to a combination of configurable email addresses, cellular text messages or phone numbers.
- User interface for utility to update the credit number of prepaid consumers to MDM. Such type of user interface before login shall require password & login ID. for authentication. User interface after getting information like consumer ID, mobile number & recharge amount etc. shall update the same to MDM. The details of payment information shall also update to consumer through SMS, email etc.

Consumer:

User interface for all authorized consumers shall have ability for at least the following functionality:

- View metered data, initiate and view reports
- View data according to Time of Use(ToU) tariff
- Can make request for connection/disconnection
- User can update mobile number/email
- Can initiate service requests for maximum demand updating, meter checking etc.
- In case on net-metering consumers, user can view data for both import & export
- In case of prepaid consumers, consumers can view recharge history & present balance.
- Prepaid consumers shall be provided facility to recharge their

account by logging on user interface. User interface shall require consumer id., mobile number & password for secure login. This user interface shall be integrated with the present online payment gateway of utility.

INTEGRATION WITH OTHER SYSTEMS

- MDM shall preferably interface with other systems on standard interfaces and the data exchange models and interfaces shall comply with CIM / XML / IEC 61968/IS15959/ Indian Companion Specification/ any other open standard. MDM solution shall be Service Oriented Architecture (SOA) enabled
- MDM integration with other systems shall include but not limited to the following: o HES for data exchange from other AMI solutions
  - o Utility Administration
  - o Existing other Data Collection Systems
  - o IVR system, CRM, Consumer Portal
  - o Billing and collection system
  - o Revenue Management System
  - o GIS Systems integration with CIS and with MDM system support of interface with HHU or manual reading system etc.

AMI Implementing Agency (AIA) should provide suitable number of HHUs to read and update the data in MDM in case of any communication failure between meter and HES/MDM.

The major scope for each of the activities is detailed hereunder.

Requirement ID	Functionality	Description
Das.1.0		System features :-
Das1.1	Provision to Collect and Manage meter data	A system that collects and comprehensively manages meter data from system (b the BESCOM network) meters and select customer meters using MODBUS/DLMS/COSEM/ IEC compliant protocol. As most of the meters provided presently are Modbus compliant, Modbus/ TCP shall be the preferred mode of communication.
Das1.2	Remote capturing of meter data from system & select consumer	A system that captures the meter data remotely from all the meters at 33 kV & 11 kV Feeders, Distribution Transformers and HT/select LT Consumers / Smart meters /Open Access Meters/ Net Meters/ Pre-paid meters for sending it directly to the remote collection centre i.e. sub division office and

	meters	Data Centre/ DR Centre.
Das1.3	Provision of communicat ion media	The system provides for GSM/GPRS/EDGE/CDMA/PSTN/ Low Power radio or any other suitable Communication technology between Meters located at Distribution transformer/HT/LT consumers and Sub division office. The system also provides for above mentioned or any other suitable communication technology from Data Logger PC/DCU/MODEM located at substation to the Sub division Office.
Das1.4	Optimal utilization of meter data	A system that optimally utilizes meter data for distribution management and billing.
Das1.5	Provision of a decision support system	A decision-support system for distribution operations, asset management and planning actions, e.g. Peak load monitoring shall help in finalizing the requirements for creation of additional electrical network element or up- gradation of existing electrical network element to meet the increased demand / load growth, Power factor monitoring shall help in capacitor placement requirement, voltage monitoring shall help in identifying low voltage areas for network up-gradation, data captured on imbalance between phases for DT, substation feeders/ incomers and 3 phase consumer meters can be used to increase reliability/plan load balancing job /advise customer to transfer loads between phases etc.
Das1.6	Identification of poorly performing areas	A system that pinpoints poorly performing areas in the sub- transmission / distribution network, based upon the technical parameters, such as area wise distribution losses, theft, outages, overloaded circuits/equipment, voltage imbalance, reliability indices, power quality etc.
Das1.7	Helping in network upgrade actions	A system that aids decision- making on network upgrade actions by leveraging of historical meter data to calculate area-wise load growth, equipment wise, downtime/outage statistics, seasonal effects and usage pattern for long term and short term planning.
	Enabling health	A system that enables „health“ and performance-

Das1.8	and performance monitoring of assets	monitoring and management of important system assets (feeders/ transformers).
Das1.9	Detection of HV/DTR outages	A system that enables quicker, „event-driven“ detection of HV/DTR outages thereby improving reliability indices and customer satisfaction.
Das1.10	Monitoring of customer performances	A system that enables monitoring of customer “performance”, e.g. contract demand violation, peak load violation, tamper counts, average power factor etc. The system should also have provisions to cover usage patterns to solve high consumption complaints, facilitate calculation of assessed readings for stopped meter cases, detect low consumption cases by comparing average historical consumption with actual consumption.
Das1.11	Enabling dispatch of event notifications	A system that enables dispatching of event notifications to targeted recipients for faster field response and decision making.
Das.2.0	**Scope of deliverables :**	
Das2.2	Application software for capturing, validating and analyzing the Meter data	Application software for capturing, validating, scheduling and analyzing the Meter data at the electrical Substation and Sub division offices scalable for a size of Network.
Das2.3	Application software at data center	Application software for acquiring incremental meter data from Data logging system of all the sub division offices under the BESCOM area for aggregation, analysis and
		generation ofvarious MIS report through appending of the Metering module.
Das2.5	Acquiring meter data from Modems/DCUs at sub stations, Smart Meters, MFT etc.	The system must be capable of acquiring meter data from Modems/DCUs at sub stations, Smart Meters, MFT etc.

Das.3.0	**System Architecture : General Notes**	
Das3.1	Provision of an integrated software system to meet the functionality of AMR	An integrated software system should be provided to meet the following Functional requirements spanning Automated Meter Reading :- i. Real Time data acquisition from Meters, ii. Historical data acquisition from Meters, iii. Supervisory function i.e. processing, monitoring, analysis and diagnostics, iv. Data exchange v. Storage of data vi. Report generation and reporting vii. Facility for user defined forms and reports e.g. calculation of Feeder/ DT performance statistics viii. Facility for time synchronizing ix. Alarm list x. Event list xi. Limit value violations
Das3.2	Flexible deployment / implementation of software system	The software system deployment/implementation should be flexible. The deployment may include installing the software at various locations like substations, sub divisions and data center. The system architecture will be modular so that only the required modules need to be installed at any given location. (e.g. installation at substation computer may have modules like data acquisition or network topology management. But data aggregation/analysis modules may be installed at sub division offices, data center etc. as per the requirement of the BESCOM)
Das3.3	Menu driven software system	The software shall be menu driven functions for automatic data capturing, periodic data uploading etc.
Das3.4	Provision for local / remote data collection	The software shall have option for data collection from meters connected locally or that are located in remote locations, through modem communication.
Das3.5	Facility for Web & Android	Software shall have web & Android based front end.

	based front end	
Das3.6	Provision for	The software shall ensure data validation at both ends e.g. at the substation end before transmission and Sub division office after reception to eliminate possibility of
	data validation at both ends	garbage data. The system at Sub division office should apply comprehensive data validation before accepting and using meter data.
Das3.7	Provision for flexibility, user friendly and scalability	The software system shall be flexible in terms of System & Application software, user friendly and scalable upwards and downwards.
Das3.8	Software system with robust architecture, high availability and reliability	The software should be based on a robust architecture model / framework that is highly scalable/available/reliable, gives good performance, and offers distributed computing.
Das3.9	N-tier design methodology	The software would be designed with multi-tier (N- tier) design methodology. It should have distinct tiers representing the client/ business/database layers etc.
Das3.10	Client tier	The client tier will be the interface of the software with the BESCOM‟s operations/ dashboard user. The client tier will provide all the user interfaces for the operational and supervisory activities involved in meter data acquisition, processing and analysis.
Das3.11	Business logic tier	The business logic tier would service the requests made by the client tier. These requests could be automated, based on user-defined schedules or on- demand from the user.
Das3.12	Automatic workflow process from data acquisition to analysis	Normal workflow processes from meter data acquisition to analysis would be as automated as possible; for example user intervention would be sought only for data editing or verification decisions.
		The database tier should comprise an RDBMS that should be designed to be able to maintain the relationships between meter

Das3.13	Database tier	and network assets, network topology, user privileges, service points, customer accounts and other entities.
Das3.14	Maintenance of time stamped database	The database should also maintain a time-series repository that stores the data collected and processed from meters, including interval usage data, event logs and outage history, as well as derived data such as aggregations and asset performance indicators like load factor and load duration curves.
Das3.15	Optimal designing of database	The database tier should be optimally designed to exploit both normalized as well as multidimensionaldata models.
Das3.16	Provision of OLTP and OLAP models	Both OLTP (Online Transaction Processing) and OLAP (Online Analytical Processing) models should be exploited for ensuring performance and scalability.
Das.4.0	**Features of Data logging system at Sub station:-**	
Das4.1	Data collection on a common data structure data converters	Software shall be capable of collecting data on a common data structure / format from Feeder meters of various manufacturers installed in the Sub station. The data logging software package should be able to integrate, extract and analyze data of different make of Meters.
Das4.2	Data collection at sub station via RS485/ RS232	The software at Sub station will have the ability to perform remote data acquisition from Meters using RS485 / RS232 port Converters.
Das4.3	Main areas of data collection	The software will in general collect the following data from the meter- a. Billing Data b. Load survey profiles c. Tamper data d. Date and time of collection of data e. Instantaneous parameters at the time of collection
		A typical list of data acquisition from the Meters has been mentioned below :

Das4.4	Typical list of data acquisition from the Meters	iv) Acquire real time instantaneous data like voltage, current frequency, power factor, active power, reactive power etc. at the specified regular intervals (15 minutes-30 minutes as per meter specification) for online local monitoring at substation level. v) Acquire stored historical values of data at regular interval with power consumptions, accumulated energy,accumulated power, maximum demand and other parameters. vi) Acquire real values of specified parameters on demand. vii) Synchronize date and time of all meters.
Das4.5	Provision of generating critical events	Software shall be able to provide details of criticalevents (e.g. No communication with Meter,, Power failure etc.) and necessary provision should exists to report the correct event to user.
Das4.6	Provision of manual entry of data in case of meter change	Software shall have facility to enter manual readings & associated data for taking care of meter change on feeder, but only with appropriate user identification,security and audit trail.
Das4.7	Seamless transfer of data even in case of meter change	Software shall show and transfer data seamlessly evenin case of meter change. An indication of meter change shall be available.
Das4.8	Storage of meter data at sub station	Software will acquire and store the Meter data in the Data logger at substation in it's local database. MDAS server will poll the sub station data and store in its database at MDAS server.
Das4.9	Mode of data transfer from sub station to Subdivision office	Normally the data transfer from Substation data logging system to MDAS SERVER will be over GSM/GPRS/ RF/ EDGE/CDMA/PSTN/LPR by dialling from either end at some specified interval of time.

Das4.10	Facility for back up and restoration of data	Facility for taking backup & restore of data collected at substation shall be provided in software.
Das4.11	Administrator facility	Substation software shall provide administrator facility to decide the storage of data on local computer. However, the sub station computer shall have a storage capacity of Meter data of at least 90 days.
Das.5.0	**Features of Data logging system at subdivision office :-**	
Das5.1	Periodicity of data collection	System shall be capable of collecting data from all the HT consumers at least every one Hour and from all the Distribution Transformers at least once in 24 Hours.The sub station data shall also be polled at least once in 24 Hours.
Das5.2	Functionality of Sub division office Data acquisition software	The Data acquisition software at Sub division officemust have the following functions : a) Data Collection : It shall collect data from the remote Data logger systems installed at the substations and store in its local Database. It shall also collect Meter data directly from DTs and HT/select LT consumers through GSM/ GPRS/RF/ EDGE/CDMA/PSTN/LPR Modems and store in its local database. b) Data Processing : It shall use data from the database to create reports, charts and spread sheets. c) Data transfer to data center : It shall be able to transmit entire incremental meter data to data center andshall reside in the Metering module for further aggregation, analysis and MIS generation. d) Messaging : Via GSM/GPRS/EDGE/CDMA e) Program Generator : It shall have editors and configuration software. f) Facility to communicate with multiple clients simultaneously through multiple communication

		lines. g) The communication shall be scalable andconfigurable to various media like PSTN, CDMA, GSM, RF, LoRA, GPRS, EDGE or LPR Modem etc.
Das5.3	Availability of sufficient storage capacity	The system shall have sufficient memory capacity for storing every Analog, Digital and Accumulator data of all connected remote Data loggers in the substations as well as all DTs and Consumer data for a period of at least one year.
Das5.4	Generation of DT wise, Feeder wise and Substation wise data	The software shall provide DT wise, Feeder wise and Substation wise data for generating summary reports, statistical data, performance indices etc. in user defined
	base	forms.
Das5.5	Ability of software to integrate, extract and analyze data of different make of Meters	Software shall be capable of collecting data on a common data structure / format from DT meters and HT/select LT consumers of various manufacturers. The data logging software package should be able to integrate, extract and analyze data of different make of Meters.
Das5.6	Manual/ automatic mode of data transmissio n	There should be provision for manually dialing the modems connected to the DT and Consumer meters or by configuring the software to collect the data from meters automatically with the help of Scheduler feature provided for auto dialing.
Das5.7	Viewing / exporting of collected data	The collected data can be viewed in the form of customized reports. User can take print outs of these reports, export the data into spreadsheets, or convert the data in the form of flat file.
Das5.8	Mode of transfer of Meter data A) Data retrieval by sub division office from sub-station. B) Data transfer from	The data file will be transferred from the sub- stations to MDAS server in one of the following possible methods :- Data acquisition software at sub division office may dial up the substation software over PSTN/GSM/GPRS/EDGE/ CDMA/Low power radio at some specified intervals and retrieve the data file.

	sub- station to sub division office	Substation software may dial up sub division office data logger system over PSTN/ GSM/ GPRS/ EDGE/CDMA/ RF/ LoRA or Low power radio at some specified interval and transfer the data file.
Das5.9	Facility for archiving, deletion, backup & restoration of the data	Facility for archiving, deletion and taking backup & restore of entire or part of the data collected at Sub division office shall be provided in Software.
Das.6.0	**Meter Data Management: software requirements**	
Das6.1	Configurable data collection engine for meters of different make	The Data collection engine of the Data logging software shall be configurable for Meter of different make and shall have the ability to perform remote data acquisition from system and customer meters.
Das6.2	Enabling of data acquisition from different AMR configuration	The software will enable data acquisition from different AMR configuration schemes (based on location and selection of system/consumer nodes)
Das6.3	Enabling of data acquisition over any communication media	The software will enable data acquisition over any of the locally and reliably available communication media : GSM/ GPRS, EDGE, CDMA, PSTN, RF, LoRA, Low power radio etc.
Das6.4	Provision to configure and manage technical parameters for	The software will be able to configure and manage technical parameters for the communication media used in the project.
	communication media	
Das6.5	Provision of remote reading & collection in both scheduled batch mode	Remote reading collection will be possible in both scheduled batch mode (automated) as well as in the on- demand (real-time) mode.
Das6.6	Features of scheduled mode	In the scheduled mode of data collection, the software will allow reading cycles to be configured for either individual meters or groups of meters. Appropriate time windows for data collection from different meters based on location/type can be set. The data

	of data collection	collection could be at any one of the pre-defined monthly, daily, hourly or quarter-hourly frequencies or at any user- defined frequency greater than 15 minutes.
Das6.7	Support for both inbound and outbound communication	The software will support both inbound and outbound communication, i.e. data transfer could be initiated by either the remote meter or the central software.
Das6.8	Type of Inbound communication	At minimum, inbound communication will include event notification calls for power outage and restoration events. The event driven polling of meters shall enable pinpointing of faults during outages, defective or stopped meter.
Das6.9	Type of outbound communication	In outbound communication, the number of retries made by the software for failed meter readings will be configurable. If the meter cannot be read even after the specified number of retries, the system will raise an alarm and generate meter reading exceptions to enable tagging of cases for site verification.
Das6.10	Ability to retrieve bothinstantaneous and logged data	The software will have the ability to retrieve both instantaneous and logged data from the meter.
Das6.11	Support for import of meter data	The software will support import of meter data from external sources in industry-standard formats like ASCII, CSV or XML. It will also allow manual entry of meter data in exceptional cases only with appropriate user identification, security and audit trail. The input sources of meter data could be CMRIs (Common Meter Reading Instruments), substation log books etc.
Das6.12	Synchronization of all meters to a common fixed reference	The software will be able to synchronize the date and time of all meters to a common fixed reference. All the raw meter data entering the system via AMR or any external means is time- stamped and stored for audit and further analysis.
Das.7.0	**Network Topology Management**	
Das7.1	Ability to capture and maintain the geographic /	The software will be able to capture and maintain the geographic / administrative / regional hierarchy of the BESCOM‟s

		control area, i.e., the tree hierarchy of zones,
	administrative / regional hierarchy	circles, divisions, subdivisions and substations constituting the BESCOM.
Das7.2	Ability to capture and maintain the electrical network topology	The software will be able to capture and maintain the electrical network topology, i.e. substations, feeders, transformers, LT & HT consumers.
Das7.3	Flexible and Indian context oriented regional hierarchy and topology	Both the regional hierarchy and topology would be specific to the Indian context and flexible enough to account for different voltage levels in Indian sub-transmission and distribution networks e.g. 66/33/22/11/0.4 KV.
Das7.4	Provision to capture and maintain associations between various metering nodes	The software will be able to capture and maintain associations between various metering nodes (both system and consumer meters) and the regional hierarchy/ network topology.
Das7.5	Typical list of System metering nodes	System metering nodes could include AMR-enabled meters located at these network points, among others: (i) Outgoing feeders from grid substations (at 33kV/ 11kV etc), (ii) Incomers (33kV etc) at the power/secondary substations, (iii) Outgoing feeders (11kV/ 6.6kV etc) from the power/secondary substations, (iv) inter-region power import / export tie-points on sub- transmission/ distribution feeders, (v) Distribution transformers (DTR) primary/secondary.
Das7.6	Typical list of Consumer metering nodes	Consumer metering nodes could include AMR-enabled meters located at the service points of selected H.T./L.T. consumers (e.g. those with load above25kVA)
Das7.7	Provision for modification in existingmetering nodes	The software will allow modification of existing metering node parameters.
Das7.8	Provision to add virtualmetering	The software will allow addition of virtual metering nodes and associate the same to the regional hierarchy /

	nodes	network topology.
Das7.9	Provision to Navigate to any level of the regional hierarchy/ network topology	Navigation to any level of the regional hierarchy / network topology would be simple and intuitive viadrill- down mechanism.
Das7.10	Provision to display SLD	Software will be able to display SLD schematics for important network areas.
Das7.11	Provision to depict Single line diagram	Software shall have facility for creating data base and display of single line diagram of entire electrical network and embedding of acquired data (both analog& digital) of each feeder in real time.
Das.8.0	**Data Validation, Editing and Estimation (VEE)**	
Das8.1	Supporting of automated rule-based validation	Software will support automated rule-based validation and estimation of raw metered data.
Das8.2	Supporting of multiple data states	The software would support multiple data states for metered data through its transition from acquisition to analysis e.g. invalid, estimated, edited, verified, validated etc.
Das8.3	Configuration of validation rules	The software will allow configurable validation rules that may be selectively applied to an individual metering node or groups of metering nodes or to channels common to different metering nodes.
Das8.4	Logging of validation failures	Validation failures would be logged for audit purposes.
Das8.5	Backing up of raw data	Raw data would be backed up for audit purposes.
Das8.6	Provision of meter data estimation routine	The software will have a meter data estimation routine that will be triggered on occurrence of validation failures.
Das8.7	Enabling of estimationroutine	The estimation routine can be selectively enabled/disabled.
Das8.8	Provision of manual	The software allows manual editing of metering data with audit

	editing	trail.
Das8.9	Provision for audit trail	All data state transitions would be logged for audit trail.
Das.9.0	**Data Analysis & Charting**	
Das9.1	Processing of validated meter data	The software will enable processing of validated meter reading data for generation and storage of different time series channels. A channel would hold data pertaining to one particular parameter.
Das9.2	Support for multiple channels for multi parameters	The software will support multiple channels for multi- parameter such as Voltage, Current, Frequency, Energy, Energy demand, performance indicator and event related data.
Das9.3	Support for channels of different time series	The software will support channels of different time granularities, i.e. hourly, daily, monthly etc.
Das9.4	Support for different channels for different type of data	The channels could hold direct measured data, derived (calculated) data, or data imported from externalsources.
Das9.5	Viewing of time series data in tabular / graphical form	User will be able to view time series data in tabular as well as graphical format.
Das9.6	Ability to show status of time series data element	The software will be able to highlight the state of a particular time series data element, e.g. if it is absent, edited, estimated etc.

Das9.7	Comparison of multiple time series data	The software will enable user to compare multiple time series together. The data series could pertain to the same channel or different channels.
Das9.8	Facility for automated filling up of certain derived time series channels based on data in one or more other channels	Automated filling up of certain derived time series channels based on data in one or more other channels will be enabled; e.g. data for the power factor channelof a particular metering node can be calculated using the data in the active power and reactive power channels of the same node. The latter two may have been directly filled with measured data from the meter.
Das9.9	Provision of setting/editing of the conversion formulae	The software will allow setting / editing of theconversion formulae for the derived channels. The conversion formulae can be based on simple arithmetic / trigonometric / aggregation functions.
Das9.10	Provision of aggregation of time series data	The software should allow aggregation of time series data based on parameters like geography (regional hierarchy), network topology, time and customer category
Das.10.0	**Executive Dashboard**	
Das10.1	Provision of Executive dashboard	Various the BESCOM offices, such as Circle, Division, Sub division etc can interact with master Metering (AMR as well as nonAMR enabled) / Billing database at data center to provide the below mentioned features.
Das10.2	Provision of selective monitoring of summarized data	The software would support selective monitoring of important summarized data at user-defined intervals that would aid in decision-making for distribution operations and planning actions.
Das10.3	Highlighting of key performance indicators	Key performance indicators, like AT&C losses, SAIFI, SAIDI, CAIDI (but not limited to) will be highlighted for every level of the network hierarchy.
Das10.4	Energy balance at different network levels	Energy balance at different network levels will be captured and displayed. This enables monitoring losses by region (subdivision/division /circle etc.) and by network asset (transformer/feeder).
Das10.5	Monitoring of losses at different voltage levels	Monitoring of losses at different voltage levels will be enabled.
	Display of	The software will enable capture and

Das10.6	load survey analysis	display of data from multi-parameter load survey analysis. Monitoring of usage/demand patterns would thus be enabled.
Das10.7	Monitoring of peak load	Peak load at different network levels could bemonitored.
Das10.8	Monitoring of performance factors	Performance factors like load factor, power factor, utilization factor, load duration curves would be monitored.
Das10.9	Provision of transformer load management	The dashboard will enable transformer loadmanagement. User will be able to monitor overloading/ under loading, phase imbalance, load factor, utilization factor, load

		duration curves of transformers.
Das10.10	Provision of Feeder load management	The dashboard will enable feeder load management.User will be able to monitor overloading / under loading, phase imbalance, load factor, utilization factor, load duration curves of feeders etc.
Das10.11	Personalization as per the user's preferences.	The software would support personalization of the dashboard displays as per the user's preferences.
Das10.12	Navigation from one level of network hierarchy to another	Navigation from one level of network hierarchy to another will be intuitive and drilldown will be possible
Das.11.0	**Reports**	
Das11.1	Generation of reports based on the results ofdata analysis	The software will be able to generate and display reports based on the results of data analysis. The reportsmodule will be used as a more data- heavy alternative tothe Executive Dashboard.
Das11.2	Reporting on energy flow, performance factor etc.	The software will be able to display reports on all energy, demand, performance factor and event related data available for different metering nodes.
Das11.3	Generation of reports with date range	Each report will allow user to specify parameters like date range, end points for which reports need to be generated.
Das11.4	Type of reporting	The reports shall be Web & Android based.
Das11.5	Exporting of reports toother applications	The software will enable the user to export reports into other application software like ERP, Microsoft Excel etc. for further processing.
Das11.6	**Reports at Substations :**	
Das11.6.1	Finalization of reporting requirement as per the BESCOM	Few typical reporting requirements are mentionedbelow, exact formats & requirement may be finalized asper the requirement of the BESCOM.
	Facility to	Software at substation level shall provide

Das11.6.2	configure &view parameters in tabular/graphic form	facility toview electrical network, configure & view parameters captured in tabular & graphical format.
Das11.6.3	Facility to query data based on date & parameter name	Software shall have facility to query data based on dates & parameter name. Software shall be able to show trend for single parameter & comparative trend for multiple parameters based on the selection.
Das11.7	**Reports at Subdivision office**	

Das11.7.1	Provision for comprehensive reporting and MIS facility	Software at Sub division office shall provide comprehensive reporting facility. If required it may interact with data center and should provide fixed format as well as query based reports in tabular & graphic format as required by user.
Das11.7.2	Option to view data selectively in numerical / Graphical form	The user should have option for viewing selective data like Instantaneous parameters, Cumulative Energy Readings, Tamper information's, Tariff- wise Billing Data for each reset backup, Load Survey data, Meter Programming records. Option should be provided to view the Load Survey data in both numerical as well as In Graphical format with selective or composite view of parameters and in different styles viz. bar and line.
Das11.7.3	Generation of summary report of meter data for any load violation and tamper counts	The software should scan through each meter data and generate a summary report of billing data, contract demand violation / peak load violation/ off days violation along with tamper counts for that particular meter.
Das11.7.4	Provision of menu option for viewing each data report	Menu option shall be given for viewing each data reports. The options will be enabled based on the availability of the data for the meter selected for data viewing. Each report header should give the information regarding the Meter serial Number, RTC, Date and Time of data collection, Type of collection, CT/PT details and other important consumer details.
Das11.7.5	Typical list of reports to be generated	Reports should provide detailed information on Billing data, Load Survey data, Profiles, Tamper information, Programming mode records and other system irregularities. Following is a representative list of reports for different levels of the network hierarchy and for different timeframes. (i) Energy balance report (ii) Consumption trends report (iii) Load factor report (iv) Reliability analysis Report (v) Asset utilization report (vi) Electrical network monitoring report
		User should have extensive Search option for search

Das11.7.6	Availability of extensive search options	using Meter number, Consumer Number, Consumer Name, Location, Date of Reading of meter. An explore option should also be given for listing out all the meter data available in the system. This menu option will provide the list of data files sorted in the order of serial numbers, consumer account number and location.
Das11.7.7	List of a few typical	Few typical reporting, requirements are mentioned below, exact formats & requirement may be finalized as per the requirement of the BESCOM. Ø Display of Electrical Parameters (Load current in

	reporting requirements	Amp, power factor, frequency, voltage, active, reactive and apparent power etc.) in Tabular Formats and as Trends (Graphs) Over Periods (e.g. for a week or month) Ø Comparative tabular & graphical reports for more than one meter & more than one parameters (comparison of pure values as well as Min, Max, Sum, Average) Ø Min, Max, Sum, Average electrical parameters values, its time of occurrence and duration of maximum and minimum values Ø Graphical Display of Maximum Power Demand Analysis Ø Software shall have facility to query data based on dates & parameter name Ø Software shall be able to show trend for single parameter & comparative trend for multiple parameters based on the selection. Ø Support for sending report using Email or Alerts Ø User Configurable Reports using MS Excel Ø Detailed Error Reporting and diagnosis through Log Files and online display of Error Status Ø Printing and Exporting of Reports to MS office. Ø % availability factor of feeder (i.e. % of time for which power was available for feeders to know the reliability index of the feeder)
Das11.8	**Reports at the BESCOM offices, suchas Division, Circle, Head Quarter etc. :**	
Das11.8 .1	Reporting facility at various the BESCOM offices	The BESCOMoffices can interact with Metering/ Billing database at Data center to provide extensive analysis & reporting facility. It shall also have extensive search options and should provide fixed format as well as query basedreports in tabular & graphic format as per the requirement of the BESCOM and described in detail at para Das.11.7 above (i.e. Reports at Sub division offices).
Das11.8 .2	Geographic/ administrative/ regional hierarchy wise reporting facility	The various offices of the BESCOM e.g. zones, circles, divisions etc. can login to the system for generating and viewing various MIS reports, statistical data, performance indices etc. asper their requirement.

Das.12.0	**Event and Alarm Notification**	
Das12.1	Monitoring of important events	The event list shall contain events, which are important for monitoring. The date and time has to be displayed for each event.
Das12.2	Chronological registration of events	The events shall be registered in a chronological event list, in which the type of event and its time of occurrence are indicated. It shall be possible to store all events in the computer. The information shall be obtainable also from printed Event log.

Das12.3	Listing of faults, errors and limit value violation in alarm list	Faults, errors and limit value violation of all values occurring shall be listed in an alarm list. Audible annunciation must be provided on receiving alarm. It shall contain unacknowledged alarms and persisting faults. Date and time of occurrence shall be indicated.
Das12.4	Summary display of alarm situation	The alarm list shall consists of a summary display of the present alarm situation. Each alarm shall be reported on line that contains: Ø Alarm date and time Ø Name of the alarming object Ø A descriptive text Ø Acknowledgement state
Das12.5	Acknowledgement of alarms	The operator shall be able to acknowledge alarms. Acknowledged alarms shall be marked at the list.
Das12.6	Typical list of items on which system can generate alarms	The system will analyze time- series / meter data and generate alarms/notifications. Following is the representative list of items on which system may generate alarms : 3.3.A.1 Alarms based on consumption patterns 3.3.A.2 Alarms based on loading conditions 3.3.A.3 Alarms based on tamper detection 3.3.A.4 Alarms based on outage detection 3.3.A.5 Alarm based on violation of limit values 3.3.A.6 Ability to configure criticality / priority of the events
Das12.7	Framework to configure thresholds for generating alarms at each end-point	The system will have framework that allows user to configure thresholds for generating alarms at each end- point. (e.g. one set of end points, user should be notified if daily consumption exceeds Y kWh and for some other end points alarms should be generated only if the daily consumption exceeds X kWh).
	Alarm on failure in	The system will also generate alarms

Das12.8	communication, loss of data etc.	based on any failure in communication, missing/loss of data.
Das12.9	Supporting of alarm/ notification dispatch via comm. media	The system will support dispatching alarms/notification using various communication media like SMS, E-Mail, Desktop Application etc.
Das12.10	Ability to deliver alarm/ notification to multiple recipients	The system will allow each alarm / notification to be delivered to multiple recipients. (e.g. alarms corresponding to outage at DTR level should be sent to JEn, AEn, XEn, SE etc.)
Das12.11	Provision for turning certain alarm generation on/off as peruser preferences	The system will allow turning on/off certain type of alarms generation (at system wide level or for particular end point) based on user preferences. (e.g. if one does not want any Communication Failure alarms, he/she canturn off the alarm generation for this criterion)
Das12.12	Provision for turning certain alarm dispatch on/off as per user	The system will allow turning on/off dispatching alarm notifications to required recipients. e.g. if Chief Engineer, does not want to receive any alarms for some

	preferences	reasons, system should be able to turn-off the same)
Das12.13	Provision to acknowledge or ignore events / alarms	The system will allow user to acknowledge or ignore events/alarms. System will also allow user to log the actions taken, if any, for any particular event.
Das12.14	Setting of different priority levels for different events /alarms	The system will support different priority levels for different types of events/ alarms.
Das12.15	Provision of different dispatch schedules for different types of events/ alarms	The system will support different dispatch schedules for different types of events/ alarms. (e.g. Outage Alarms to be dispatched within 5 minutes of receipt and Contact Demand violation alarms should be dispatched before every billing cycle start).
Das.13.0	Time synchronization	Time synchronization : The time synchronization shallbe possible from the Work Station/ HMI through built-in function. An accuracy of ±1 milli second within the station is required. However provision is to be made available for time stamping through GPS.

3.3.12 Identity and Access Management System

Requirement ID	Feature	Functionality
Idm.1	**Adapter/ connector Support**	
Idm.1.1	Solution Compatible	The proposed solution should be compatible on all the operating systems offered by the bidder in the proposed solution including client machines which are most likely window based system.
Idm.1.2	Out of box workflow	Identity management for user provisioning should have out of the box workflow for automating approvals for user access management, self-registration and self-care functionality for reducing the administrative load and manual intervention.
Idm.1.3	IDE to design Work - Flow	The solution should provide an IDE to design the workflows.

Idm.1.4	Standard for Workflow implementation	The proposed solution should support customization of workflow for every business object/process.
Idm.1.5	Connector availability for target systems	Identity Management Solution should have Connector availability for all target systems that need to be managed.
Idm.1.6	Connector development tool	The proposed solution Should provide resource kit or an SDK to add new Resource adapters.
Idm.1.7	Agent-less Architecture	Identity Management solution should be Agent-less Architecture and use gateways where agent is required.

Idm.1.8	Certification	The Proposed solution should be certified as "Liberty Interoperable?" And Should be interoperable with other products / solution based on SAML 2.0 for the following profiles: 1. Identity Provider 2. Identity Provider Extended 3. Service Provider 4. Service Provider Complete 5. Service Provider Extended 6. ECP 7. Attribute Authority Requester 8. Attribute Authority Responder 9. Authorization Decision Authority Requester 10. Authorization Decision Authority Responder 11. Authentication Authority Requester 12. Authentication Authority Responder 13. POST Binding 14. GSA Profile
Idm.1.9	Indexing	The solution should leverage an intelligent indexing system to manage user identities and access privileges, leaving account information with the information owner and thus avoiding the time- consuming effort of building and maintaining another user repository.
Idm.1.10	Discovery and Correlation of user Account	The Proposed solution should provide an automated way to discover and correlate all accounts associated with an individual to speed the account mapping process.
Idm.1.11	User Repository	The solution should use separate repository for user data and audit log information.
Idm.1.12	Open Provisioning Standard	The solution should support open provisioning standard like SPML.
Idm.1.13	Authentication/ authorization framework	The solution should allow enterprise applications and platforms to integrate into the centralized authentication/ authorization framework seamlessly. The solution should support both thick client as well as web based/ android based applications.
Idm.1.14	Access Management	The Access Management solution should be capable of running on web servers as well as application

		servers.
Idm.1.15	Pluggable authentication module	The proposed solution should provide the ability for pluggable authentication module, and new auth modules should be able to be added via an SDK.
Idm.2	**Access Rights Capabilities and Access Control**	
Idm.2.1	Data protection	Sensitive customers' data must be protected in accordance with guidelines that will be agreed with the Purchaser.
Idm.2.2	Entry screens	On completion of successful logon, the following information shall be displayed: Date and time of previous successful logon. Details of any unsuccessful logon attempts since the previous success full logon. Reminder of the onus of the user to bring to notice any

		aberration observed.
Idm.2.3	Unsuccessful logon attempts	After predefined number of consecutive unsuccessful attempts to logon to a user Id, that user id shall be disabled against further use until the same is enabled by System Administrator.
Idm.2.4	Application time out	Terminal / User Id time-out shall occur if a terminal / user ID remains logged onto a system/ application but remains inactive for a predefined time. If the terminal is dedicated to one application then timeout shall occur after a pre- defined time inactivity. The screen shall be cleared of any information when time out occurs.
Idm.2.5	Limited application software on key systems	Software which can be used to modify existing programs on systems/ applications, e.g. editors and compilers, shall have access restricted to authorized staff only. Any such software which is not needed for operational reasons shall be removed after the modifications have been made.
Idm.2.6	Segregation of duties	Clear segregation of duties between user groups is necessary to minimize the risk of negligent or deliberate system misuse. In particular segregation must be implemented between: 3.4 Business use. 3.5 Computer operations. 3.6 Network management. 3.7 System administration. 3.8 System development &maintenance. 3.9 Change management. 3.10 Security administration. 3.11 Security audit. Where it is operationally not possible to adhere to this policy advice shall be sought from the Purchaser on security. As a minimum, the above segregation shall be enforced at the User Id level i.e. the above functions shall not be allowed from the same

		User Id.
Idm.2.7	Communicating usage restrictions	A prescribed warning screen shall be displayed immediately after a user successfully completes the logon sequence to any multi user system, server or database. This does not apply when logging onto a PC, which cannot be accessed via any other means, or when logging onto a network where no information is available without further logon (note: the screen should be presented after this further logon). This screen will emphasize the requirement to comply with requirements on usage of computer as laid down by the Purchaser. The screen will require confirmation that the user has understood these

		requirements prior top proceeding.
Idm.2.8	Controlling User's access	The system shall provide a mechanism to authorize users to access the system, revoke users from accessing the system, and modify the security information associated with users. The system shall also be able to automatically suspend or roll back a reconfigured account that violates policy.
Idm.2.9	Restricted access to resources	The system / resources shall provide a mechanism to allow or deny specified user IDs to access the system during specified ranges of time based on time-of-day, day-of- week, and calendar date.
Idm.2.10	Console operations for privileged users	The system shall provide a mechanism to allow or deny specified user IDs to access the system based on means of accessor port of entry.
Idm.2.11	Resource, access control list	For each resource, the system shall provide a mechanism to specify a list of user IDs or groups with their specific access rights to that resource (i.e. an access control list). Solution shall provide for grouping of users and assigning ACL to the group.
Idm.2.12	Group ACL vs individual ACL	Group ACL should be aggregated to individual user's ACL and in case of conflict, user's ACL shall govern.
Idm.2.13	Grant and deny access	System shall provide both Grant and Deny to a resource.
Idm.2.14	Individual access rights to users	The system shall have ability to assign users individual access rights and to define access rights available to users in a role upon their request and approval.
Idm.2.15	Job based access to information	The system shall have ability for different personnel to view different levels of information based on their job duties.
Idm.2.16	Modifications to the access list	The system shall provide a mechanism to modify the contents of a resource's access control list.
Idm.2.17	Change in Access rights	The System shall have ability to associate access-rights definition with a role within the organization and dynamically and automatically change access rights based on changes in user roles. The system shall also have ability to set designated times for changes in access rights

		or policies.
Idm.2.18	Rules for routing approvals	System should also use defined rules/ information specific to BESCOM to determine routing of approvals.
Idm.2.19	Access rights change notification	The system shall be able to compare local administrator changes against a system-of-record of account states to determine if changes comply with approved authorities and policies and shall be able to notify designated personnel of access- rights changes made outside the provisioning solution, if any.

Idm.2.20	Audits on user accounts	The solution should provide the capability to do half yearly audits on the lines of ISO 17799/BS7799 for user accounts.
Idm.2.21	Resource ownership	The system shall provide a mechanism to identify all resources in the system that are owned by a specified user ID, the resources to which that user ID is allowed access and the specific access rights for each resource.
Idm.2.22	User's authority changes	System shall also be able to detect, evaluate and respond to user authority changes made directly to a resource.
Idm.2.23	Restrictive access	Each resource delivered with the system shall have the most restrictive access rights possible to permit the intended use of that resource.
Idm.2.24	Restricted access to access control information	The system shall protect all information used for resource access control decisions (e.g., access control lists, groups lists, system date and time)
Idm.2.25	Policy simulation	The system shall provide policy simulation and „what-if" modeling of changes, i.e. simulation of effects of Policy changes before they are enacted, reporting errors, or potential problems, and ability to resolve before live operations.
Idm.2.26	Monitoring of access controls	The system shall monitor the followings :- Successful logins and login attempts e.g. Wrong user ID / Password, and login patterns Rejected access attempts because of insufficient authority All usage by privilege users e.g. Powerful access to system utilities or applications Use of sensitive resources e.g. Access to highly sensitive data Change to access rights of resources Changes to the system security configuration Modification of th package software Changes to user privileges.
Idm.2.27	Reporting on user roles and rights	The system shall have ability to report on roles, rights associated with roles and users associated with roles.
Idm.2.28	Flexible connection to multiple data stores	The system shall have flexible mechanisms to connect to multiple data stores containing accurate information on valid users.
Idm.2.29	Identity store information in	The system shall have ability to load identity store information on a scheduled bulk basis and to detect and respond to identity store changes in near real time.

	real time	
Idm.2.30	Retrieval of account information	The system shall have ability to retrieve account information from target managed resources on a scheduled basis, both in bulk or in filtered subsets to preserve network bandwidth.
Idm.2.31	Real-time local administrator account maintenance	The system shall have ability to detect and report in near real- time local administrator account maintenance (creation, deletion, changes) made directly on local resource natively.

Idm.2.32	Support for prerequisite services	The system shall define services that must be granted prior to creation of the access rights. For example, Microsoft ® Windows NT ® rights must be granted prior to granting rights to Exchange Support for entitlement defaults and constraints (each characteristic of an entitlement may be set to a default value, or its range can be constrained, depending on the capabilities of the entitlement to be granted)
Idm.3	**User Administration**	
Idm.3.1	Creation of standard User Profile	A mechanism must exist to allow a range of User Ids to be built with a standard user profiles of multiple categories, e.g. Data entry user, data modify user at the section office, division office etc.
Idm.3.2	Dormant User	Where a user Id remains unused for a pre-specified number of consecutive days, it shall be disabled. If no authorized request for reinstatement is received within a further predefined time period, the user Id shall be deleted. The user would be informed before this happens.
Idm.3.3	Segregating user access to system	All user Ids shall be set up with privileges that limit the use of the user Id to designated areas only and to ensure that other functions cannot be performed by the user ID for which they are not authorized. Some user IDs have powerful privileges associated with them and these shall only be provided and maintained by the system administrator. To prevent the provision of user IDs with privileges associated to them, when these are not required by the user, any templates used to set up user IDs shall have no default privileges associated with them.
Idm.3.4	Unique User ID	System shall be able to create unique user IDs using a set of consistent algorithms and defined policies of the owner and not in current use or previous use by the organization and not shared with others. The system shall provide a mechanism to associate specified information (e.g., user name and affiliation) with each user ID.
		Procedures for user account management

Idm.3.5	ID conventions	should define the naming convention for user IDs and the operations practices for provisioning and removing these user Ids.
Idm.3.6	Differentiating normal and privileged users	User Ids shall not consist of less than a predefined number of characters. The number of characters would be different for normal users and privileged users;
Idm.3.7	Single account with multiple authorities	The system shall have ability to create a single account with multiple authorities governed by different policies.
Idm.3.8	Temporarily Disabling	The system shall provide a mechanism to administratively disable user IDs and a mechanism for re- enabling or deleting a disabled user ID after a specified period of time. The use of this mechanism shall be privileged.
Idm.3.9	Active Users	The system shall internally maintain the identity of all active users.

Idm.3.10	Tracking User IDs	The system shall provide a mechanism to obtain the status of any user ID.
Idm.3.11	Grouping User IDs	The system shall provide a mechanism that allows a collection of user IDs to be referenced together as a group.
Idm.3.12	Limiting multiple log on	For those systems that have the architecture to support multiple logons per user ID, the system shall provide a mechanism that limits the number of multiple logon sessions for the same user ID. The mechanism shall allow limits for user IDs and groups to be specified. The system default shall limit each user ID to one simultaneous logon session. As per business process requirement, particular machine ID‟s to permit login by selected users only.
Idm.3.13	Associating IDs to processes	The system shall provide a mechanism by which the user ID associated with a process can change to a user ID that would provide any additional privileges.
Idm.3.14	Assignment of one or more roles to users	The system shall be able to assign users to one or more roles and can implicitly define subsets of access to be unavailable to a role.
Idm.4	**Self-Regulation User Administration capabilities**	
Idm.4.1	Adherence to open standards	The system shall adhere to open standards.
Idm.4.2	Secure environment	The system shall have secure environment for transmitting access changes across the Internet.
Idm.4.3	Protection of private user information	Protection of private user information through secure facilities and sound processes.
Idm.4.4	Reporting of user rights	Reports of user rights into external systems, sponsors of users and audit trails of access rights changes.
Idm.5	**Authentication**	
Idm.5.1	Authentication mechanism	The system shall provide a mechanism to authenticate the claimed identity of a user.
Idm.5.2	Single authentication	The system shall perform the entire user authentication procedure even if the user ID that was entered was not valid. Error feedback shall contain no information regarding which part

	procedure	of the authentication information is incorrect
Idm.5.3	Modification Ability to authentication information	The system shall provide a mechanism to support the initial entry or modification of authentication information.
Idm.5.4	Privileged access to authentication data	The system shall require a privilege to access any internal storage of authentication data
Idm.5.5	2-Factor authentication	System should support two factor authentications (Biometrics, tokens etc.)
Idm.6	**Password Management**	
Idm.6.1	Password confidentiality	System shall be able to securely deliver User Ids and passwords to new users electronically. User Ids and passwords, when conveyed electronically shall only be visible to the person for whom they are intended e.g. after the user has logged on to the appropriate electronic system.
Idm.6.2	Password protection	
Idm.6.3	Unique passwords	

Idm.6.4	Clearing passwords	All electronic information systems and applications shall have a password management system which meets the following requirements: c) EnforBESCOMhange of initial password at first logon. d) Allows users to select and change their own passwords at any time subsequently. e) Have ability to implement password formation rules to enforce password strength across the organization, e.g. minimum character length of password, password as a combination of numeric, alphabets & special Characters f) Have validation routines built in which, as far as possible, check that the password selected is a quality password as defined in a Policy Document to be handed over to the Purchaser at the time of implementation. g) have a confirmation process on changing passwords to cater for typing errors, h) have ability to deliver password-change success/ failure status to requestor electronically i) have the ability to enforce password change after every n days. if the password is not changed in the pre specified number of logins then the ID should be disabled requiring re- enabling by System Administrator. j) prevents reuse of passwords within a specified period/ number of times. k) does not echo passwords to screen or paper. l) Stores passwords in a one-way encrypted form away from the system/ application data files in a protected password file that is access controlled such that no users can read or copy the encrypted contents. m) Prohibit use of null passwords n) Have ability to synchronize passwords
Idm.7		
Idm.7.1	LDAP and Open Standards	
Idm.7.2	Group Policies Management	
Idm.7.3	Integration	

		for multiple systems to the same value to reduce the number of different passwords to be remembered by the user Have a challenge-response system to authenticate a user with a forgotten password by using shared secrets The system shall provide no mechanism whereby multiple user IDs explicitly shares a single stored password entry. The system shall provide no means to facilitate the sharing of passwords by multiple users. The system shall allow a user to choose a password that is already associated with another user ID. The system shall provide no indication that password is already associated with another user ID. **Directory Services Requirements for Enterprise -** The Directory Server should be LDAP v3 Compliant LDAP server should be able to replicate data between

		servers and support cascading replication. Should have support for open standards [LDAP v.3, XML] The directory service should provide support for Group policies and software restriction policies. The group policies should have settings to configure various desktop or user related settings via centralized control. These settings will include items like Browser setting, desktop restrictions, program restrictions, admin controls, software deployment etc. It should allow for almost all manual functions to be automated using group policies. Should have support for integrated authentication mechanism across operating system, messaging services. The Directory Server should have out of the box integration with the e- mail server .Should provide enhanced authentication like Kerberos which support authentication across multiple Operating system like Windows and Unix/Linux. Should be able to integrate with other Standards based Directory system for synchronizing user accounts and passwords.
Idm.7.4	Management	SNMP support for flexible network monitoring and management. Should support directory services integrated DNS zones for ease of management and administration/replication The directory service should support features for health monitoring and verifying replication. The directory service shall provide support for modifiable and extensible schema
Idm.7.5	Access Control	Support for Access Control Lists (ACLs). Support for controlling access to the directory, a subtree, entries, attributes by setting permissions for users, groups, roles and location information like IP addresses. Should provide facility to provide Rights Management Service for documents like Word , Excel etc. on the built on standards like XRML.
Idm.7.6	Multi Factor Authentication	Support for user authentication through user ID/password, X.509v3 public-key certificates, or Anonymous authentication Should support security features, such as support for Kerberos, smart cards, public key infrastructure (PKI), andx.509 certificates

Idm.7.7	High Availability	Should support partitioning in to multiple LDAP Repository architectures for scalability. Should support LDAP servers in multi master configuration Ability to keep Replicas in Synch and to enforce Replication updates
Idm.7.8	Administration	The solution should provide a comprehensive single window Admin tool locally or over internet to administer the directory services. The Directory services should have APIs to programmatically manage each component of Directory Service. The directory service shall provide support for modifiable and extensible schema both

		manually and programmatically
Idm.8	**Audit Trails & Reports**	
Idm.8.1	Time-stamped records	The system must maintain- Time-stamped recordsof every access change request, approval/denial, justification and change to a managed resource Time-stamped record of every administrative and policy-driven change to access rights
Idm.8.2	Audit Trail reporting	The system must provide reports on audit trails for users, systems, administrators and time periods, including workflow approvals, rejections, request statistics, policy compliance and Audit reports, User account reports, Access reports and Service reports and also any customized reports based on specific need.
Idm.8.3	Maintaining audit trails	Audit trail records shall be retained in a tamper proof environment in accordance with the Purchasers policy for a reasonable amount of time to allow for accountability and evidential purposes. Backup copies shall also be maintained to protect against any accidental or deliberate erasure of data.
Idm.9	**Distributed Administration**	
Idm.9.1	Defining of organizational structures	Ability to define organizational structures based on the access- granting authority
Idm.9.2	Delegation of administrative tasks	Ability to delegate each administrative task with fine-grained control at Organizational Unit Level so that the team or Dept Admins can completely perform the Administrative tasks for their Organization Unit.
Idm.9.3	Access to delegated capabilities over web	Ability to access all delegated capabilities over the Web via Web Browser with a zero-footprint client.
dm.9.4	Web access control with single sign-on environment	Ability to incorporate Web access control with single sign- on environmentand to distributed provisioning components securely over Web and Internet environments, including crossing firewalls.
	Enterprise	Ability to incorporate Enterprise Single Sign

Idm.9.5	Single Sign On products	On products to include the provisioning solution within the Thick client single sign-on environment.
Idm.9.6	Custom user authentication approach	Ability to incorporate custom user authentication approaches commensurate with internal security policies and to create private, filtered views of information about users and available resources.
Idm.9.7	Ability to import and export configurations	Ability to import and export configurations to enable migrations between Development, Staging and Production environment without delays.
Idm.10	**System Operations**	

Idm.10.1	Interaction with target resources	Ability to interact with target resources without interfering with Their performance.
Idm.10.2	Operation for temp inaccessible system	Ability to continue to operate without degradation when the managed system is temporarily inaccessible.
Idm.10.3	Function if provisioning solution unavailable	Ability for the managed resources to remain fully functional if the provisioning solution is unavailable
Idm.10.4	Users interaction with provisioning solution	Responsiveness to users interacting with the provisioning solution features for searches, reporting, approvals, self- service And auditing.
Idm.10.5	Synchronization with user information	Ability to load and maintain synchronization with user information from existing human resources and other identity systems, both statically and dynamically.
Idm.10.6	Account and authorization information from existing systems	Ability to load account and authorization information from existing operational systems without data entry
Idm.10.7	Reconcile accounts created by other adm. systems	Ability to detect and reconcile accounts created by, and/or changed by, other administrative systems (e.g., the local administration console provided with the managed resource)
Idm.10.8	Support for configuration and scalability requirements	Support for configuration and scalability requirements for large environments and high- availability operations utilizing share communication capacity on corporate WANs and Webs.
Idm.10.9	End-to-end security	End-to-end security over account changes.
Idm.10.10	Web-based functionality	Entirely Web-based functionality to allow easy distributed administration on an unlimited scale.
Idm.10.11	Integrated functionality w/o duplicate data entry	Integrated functionality that does not require duplicate data entry or manual synchronization of information shared for multiple functions.
Idm.10.12	Server configuration for high availability opn.	Ability for servers to be inexpensively configured for high- availability operation, including disaster recovery.

Idm.10.13	Utilized data store configuration for high availability opn.	Ability for utilized data stores to be configured for high-availability operation.
Idm.10.14	Accuracy in provisioning solution	Ability for provisioning solution to maintain accuracy when local administrators maintain privileges to make changes to target resources.
Idm.10.15	Resilient communication s design	Resilient communications design between distributed components to withstand network or target resource outages.
Idm.10.16	Multi-layered security architecture	Multilayered security architecture for operation in a “demilitarized zone ” ((DMZ) and for management of users and systems in untrusted environments.

Idm.10.17	Interaction with external systems	XML-based extensibility an interaction with external systems
Idm.10.18	Common and de facto standards	Use of common and de facto standards for interfaces that are internal and external to the provisioning solution.
Idm.10.19	Integration of LDAP directory services	Integration of LDAP directory services as identity stores, access control system authorization stores and internal user account and policy stores.
Idm.10.20	Audit trails and system recovery	Inclusion of a persistent data store or repository for audit trails and system recovery.
Idm.10.21	Quick response to user interactions	Ability to respond quickly to user interactions including report requests, access change requests, policy changes and password self- service.

3.3.13 System Security Requirement

Requirement ID	Functionality	Description
Ss.1	**Audit Trails and Reports**	
Ss.1.1	Tracking key system accesses	The system must be capable of generating log trails, which contain details about any read / write access to sensitive data. Details must relate activity to an identifiable person. They must be configurable, so that filters and switches can be used to lower performance overheads and focus on areas of concern. It is important that the audit trail that is generated contain enough information to support after-the- fact investigation of loss or impropriety.
Ss.1.2	Time-stamp based auditing method	Where equipment uses a real- time clock to timestamp audit and other time related events, the clock should be regularly checked for synchronization with both connected systems and reference clock outside of the system, in this case the Indian Standard time. For daily reporting, this would ensure that the reports generated have some sanity given continuous data input
		Where the security audit trail becomes

Ss.1.3	Exception reporting	unavailable for any reason, the system shall continue to operate but will trigger an alarm. Action shall be taken as soon as possible to rectify the situation

Ss.1.4	Detailed system access tracking	System and application use and attempted use will be monitored to ensure that the integrity and security of the client and customer data is maintained. The documented process shall include details of : who will monitor what event and how, the frequency of monitoring, what to do when suspicious activity is noted, when to escalate and the escalation path. All events logged in the audit data shall be taken into account when deciding what to audit and the appropriate actions to take. The log must record the user or process responsible for the event, terminal ID where available, and the date and time of the event The following shall be monitored:- • Enabling and disabling of the audit process • Any changes to the type of events logged by the audit trail • Any changes to the audit trail itself Start up parameters and any changes to them System or application start- up and shut-down Use of selected transactions • Changes to any of the data based records
Ss.1.5	Maintaining audit trails	Audit records and journals shall be retained in a tamper proof environment in accordance with the Purchasers policy for a reasonable amount of time to allow for accountability and evidential purposes. Backup copies shall also be maintained to protect against any accidental or deliberate erasure of data.
Ss.1.6	Disaster recovery	A recovery options analysis shall be carried out to produce the practical options for those systems and networks, which are deemed to require recovery in the event of a disaster. The most effective option shall be chosen, taking into account the cost of recovery and the cost to the business of unavailability of the application.
Ss.2	**System Integrity**	
Ss.2.1	User process protection	The system should be able to protect the user process and local data from other user.
Ss.2.2	Version	Mechanisms should be in place to ensure that the currently installed software has remained

	consistenc y checks	consistent with the delivered product.
Ss.2.3	Versioning	Software used on systems/ applications shall be subject to version and change control to ensure that only the current authorized software is used at all user location.
Ss.2.4	Modification of the system	Modification or replacement of the software provided with the system would require special privileges
Ss.2.5	System maintena nce	Execution of system maintenance and repair software would require special privileges

Ss.2.6	Basic checks on data input	Data input to an application shall be validated by the application to ensure that the data is correct and appropriate. As a minimum, an application shall check input data is complete. Within the required ranges, and contains no invalid characters. Procedures shall be established to deal with any input data violations.
Ss.2.7	Time stamping modifications	The system should be able to track the date and time at which a resource was last modified.
Ss.2.8	Integrity of data passed over a communication channel	The system should have in-built mechanisms e.g. checksums to verify the integrity of data passed over a communication channel.
Ss.2.9	Data transfer lock	Where an encryption process used for data transfer fails and cannot be automatically corrected, then the transfer should not be completed.
Ss.3	**Confidentiality**	
Ss.3.1	Use of encryption	The system should have the flexibility of encrypting the data stored online.
Ss.3.2	Approval for cryptographic techniques	Any cryptographic techniques or encryption systems used to safeguard information shall have been approved by relevant authority on data security prior to their use.
Ss.3.3	Approval for security components	Only security components which have been approved by the Purchaser shall be used to protect the Purchaser's sensitive information and processes.
Ss.3.4	Documentation of encryption procedures	The procedures used to maintain confidentiality should be documented and access to them restricted.
Ss.4		**Networking and Data Transfer**
Ss.4.1	Authorized data transfer	All data transfers must be documented and authorized by the owner of the donor system. They must only be authorized where the receiving system has the capability to protect the data, i.e. it has an acceptable security rating.
		Data which is to be passed between systems shall be labelled to indicate the type and sensitivity of that data. The security policy for

Ss.4.2	Inter system data Transfers	a system will state what data may be sent to, or received from, another system and will state the translation, if any, between the labeling of the two systems. Interfaces that have been built -i.e. the data migration systems should have defined access rights. The interfaces should have a fixed enabling procedure - including the frequency with which the migration happens to and from the system, the dataflow that would happen and the data items that would be frozen during such a migration.
Ss.5	**Customer needs**	

Ss.5.1	Documentation of risks and its mitigation strategy	System developers responsible for customization should consider and document the risks and associated mitigation in the design.
Ss.5.2	Installation and configuration	Developers will document instructions on how the system is to be delivered, installed and configured in a secure manner.
Ss.5.3	Startup documentation	Developers will document instructions for the secure start- up, re-start and operation of the system.
Ss.5.4	Interface designing	Interface designs must include the capability to selectively deny access to certain types of data.
Ss.5.5	Scope control	Vendor supplied software packages must not be modified outside of the scope recommended by the Purchaser.
Ss.5.6	Software change control	A mechanism for controlling software changes during development shall be implemented. This mechanism shall as a minimum ensure that : a) The change is reviewed by appropriate group's prior to authorization, b) Changes are properly authorized prior implementation, c) All change requests are logged. d) All associated documentation is altered along with the software change. e) Version control records are maintained.
Ss.5.7	Internal data	All applications shall be designed to minimize the risk of corruption by processing errors by building in validation checks, reconciliation checks etc. ,where necessary.
Ss.5.8	Module and product testing	All new and modified software to be used on system/application shall first be tested by expert personnel to ensure that the software have been subjected to the rigor of test and thereby - a) Does not introduce added security risks b) Functions according to design specifications c) Does not adversely affect the operation of the system d) Introduces no unauthorized system

		changes.
Ss.6	**Security of web services**	
Ss.6.1	XML based Web security schemes	As web services have certain limitations with SSL type of security scheme, the web service technology shall be used with different XML-based security schemes. Some of the XML- based securities include the following – • WS-security • XML digital signature • XML encryption • XKMS (XML Key Management specifications) • SAML (Secure Assertion Markup Language) • ebXML Message service The bidder shall ensure content security, message level security and secure message delivery, metadata security

		policy, trust management and secure public key infrastructure while implementing web services using appropriate web security mechanism, which must be W3C / OASIS compliant.

3.3.9 Asset Management

Requirement ID	Functionality	Description
AM.1	Identification of business entity	The system shall have the ability to identify a business entity/district to which the equipment/assets belongs and also should be able to reorganize divisions, office codes, etc. in the case of organizational changes. The system shall have the ability to track from fixed assets to movable assets, line assets (cables, conduits) to underground assets, which run across business entities.
AM.2	Creation of multiple asset grouping	The system should able to create and define multiple asset grouping for each type of asset e.g. poles in a group of LT pole, 11 kV pole etc and again PCC Pole, Rail pole etc. The user should able to classify the asset as per the defined asset groups.
AM.3	Electronic certification of physical inventory	The system shall allow electronic certification of physical inventory for locations including, but not limited to: • Circles • Division • Subdivision • Sub office
AM.4	Creation of asset master records	The system shall have the ability to initiate the creation of asset master records from the process of creating and processing store issue documents. The system shall have the ability to identify potential fixed assets through Store transaction details.
		The system shall be able to record information such as the supplier, purchase dates, serial number against each individual piece of equipment. • Equipment / Asset identification number, Description

AM.5	Recording of purchase and all other historical information about asset	• Serial number - Manufacturer - Model number • Year of manufacturing • Maintenance history for the equipment • Cost centre • Bill of Materials • Status (e.g. installed, repaired, instore) • Supplier, • Warrant period • Location etc.

AM.6	Analytical features	The system shall be capable to record condition assessment calculation (condition analysis) as well as root cause analysis of failures (FMEA studies). Along with the risk factor (probability of failure), the consequence factor (criticality of the failure) should also be captured for each asset. The system shall also be able to analyze the stress levels on the assets (accelerated ageing) from the data of AMR/SCADA/ DMS/RT-DAS/RFMS/ERP.
AM.7	Tracking of insurance values	The system shall have the ability to track insurance values (e.g., replacement value).
AM.8	Capability to update/ regroup individual asset record	The system shall have the ability for the user to make subsequent updates to grouped or component assets. (e.g., the user may acquire, retire or transfer one component of a group of assets). The system shall provide the capability to update the individual asset record and to re-group into an existing group or Component structure.
AM.9	Review and approval of assets Assigned to his unit on transfer of BUH	The system shall allow the incoming and (or) outgoing Business Unit head to review and approve assets assigned to his Business Unit whenever transfer of personnel takes place. The system shall support this function with reports of assets under BUH‟s control.
AM.10	Maintaining the list of spares with their part no.	The system should be able to maintain the list of spares along with their part no for each equipment. The system should also be able to group equipment’s of same make and rating for the purpose of assessment of spares requirement. To avoid stock out situations and ensure minimum inventory carrying costs, the system should be able to prompt for replenishing of spares, optimal re-order levels for major assets and also for re-ordering of Daily consumables
AM.11	Capability to scan bar code tags and upload the inventory	The system shall provide the capability to scan their own bar code tags and automatically upload the physical inventory for review, reconciliation, and approval.
AM.12	Furnishing of condition of the asset on the	The system shall allow utilities to provide a 'condition of the asset' at the date of physical inventory. Examples include: • New

	date of physical inventory	• Good • Poor • Broken
AM.13	Recording of a date of physical inventory	The system shall allow utilities to record a 'date of physical inventory' when inventory counts of physical assets take place.

AM.14	Provision for mass updates to a physical inventory date field	The system shall allow utilities to provide mass updates to a physical inventory date field. This would be required for agencies that complete their inventory at one time and wish to update all of their assets with one transaction.
AM.15	Capability to identify missed or non- updated assets	The system shall allow utilities to provide the capability to identify all assets that have been missed and not updated by the physical inventory process, or to identify all assets in the following categories: • Missing or lost • Stolen • Destroyed • Under disposal review
AM.16	Capability to identify vehicles and other assets	The system shall provide the capability to identify vehicles and other assets that have been purchased or leased via various methods.
AM.17	Provision of Workflow to Identify and route lease renewals	The system shall provide workflow to identify and route possible lease renewals to the appropriate user.
AM.18	Insurance claims related asset tracking	The system shall allow asset tracking and reporting related to insurance claims and insurance recoveries.
AM.19	Provision for asset transfer transaction	The system shall provide an asset transfer transaction for collaborative data entry. This shall include the capability to enter and save partially completed asset transfers. This could include allowing the transferring agency to complete their portion of a transfer and to allow the document to be saved. At a later date, the receiving agency could access the transaction for completion and posting of the final transfer.
AM.20	Generation of reports on cost of new assets	The system shall generate reports detailing the cost of new assets acquired to replace an asset lost, missing, stolen, or destroyed.
AM.21	Provision to deactivate an asset	The system shall provide the ability to deactivate an asset when removed for maintenance and allow reactivation based on proper authorization.

AM.22	Allowing and tracking of adjustments to historical cost	The system shall allow and track adjustments to historical cost (e.g., An isolator which was captured as part of the original cost of the substation is transferred, requiring the original cost of the Substations to reflect the adjusted cost base).
AM.23	Online viewing and search of fixed asset policy and procedures	The system shall have the ability to allow agency asset managers to view and search official fixed asset policy and procedures online or via web browser/ android based browser.

AM.24	Creation of population table for identifying ownership and maintenance responsibility	The system shall contain a population table for the purpose of identifying ownership and maintenance responsibility for equipment’s.
AM.25	Provision for different depreciation schedules and methods	The system shall allow different depreciation schedules and methods for different assets within an asset group.
AM.26	Classification of assets	The system shall allow for major asset class (e.g., personal property (including vehicles), buildings (new, improvements, renovations), land, land improvements, infrastructure, lease hold improvements, and construction in progress) dependent features for tracking and reporting data elements. The system shall also be able to identify and classify the assets as per its criticality in improving the system reliability indices (SAIDI, SAIFI etc). For reliability-based asset management, the system should also be able to perform reliability analysis (N-1 criteria) or other applicable criteria.
AM.27	Tracking of an alternate replacement date	The system shall be capable of tracking an alternate replacement date besides useful life expiration date.
AM.28	Ability to link asset master records to other asset master records	The system shall have the ability to link asset master records to other asset master records for grouping (Custodian) Assignment. The system shall have the ability to flexibly track assets (parent to child relationships), to effectively have asset structures record component and 'complex' assets, essentially allowing a 'roll up' feature (e.g., the individual asset values for routers will roll up to the asset value for the network rack, which is the asset master record).
AM.29	Creation and maintenance of coding table	The system shall have the capability to create and maintain both central and agency dependent coding tables for all tracking fields (e.g., location, sub divisions, etc.).
AM.30	Uniform	The system shall have uniform naming conventions for

	naming conventions	coding employees, integrated with the HR employee number, name, or other unique identifier when assigning an asset to an employee or custodian.
AM.31	Provision of mass adjustment facility	The system shall allow mass adjustment functionality (e.g., useful life for building changes from 25 to 30 years) to update all assets in that category.

AM.32	Provision to track multiple location codes	The system shall have the ability to track multiple location codes. These codes would provide Utilities with the ability to identify where the assets are located, including but not limited to: • Substation • Feeder • Distribution Transformer • Buildings
AM.33	Provision of multiple responsibility codes.	The system shall provide agencies with multiple responsibility codes. These codes would provide agencies with the ability to identify who is responsible for the asset, including but not limited to : • Department assignment • Organization assignment • Group assignment • Individual assigned responsibility • Program responsible • District responsible • Supervisor responsible
AM.34	Identification of maintenance or capital cost	The system shall allow for the identification of maintenance or capital costs performed.
AM.35	Generation of an asset record status	Shall have the ability to establish an asset record status based on a 'level of completeness‟ and update that status and master record.
AM.36	Integration with web- based & Android based GIS Information	The system shall allow integration of web-based & Android Based GIS (geographic information system) information, such as X, Y coordinates.
AM.37	Provision of flexible selection criteria.	The system shall provide flexible selection criteria in asset management reporting (e.g., site locations and vehicles).
AM.38	Tracking and reporting of statistical information	The system shall have the ability to track and report statistical information.
AM.39	Provision of insurance reporting	The system shall have insurance reporting for risk management.
AM.40	Life cycle cost analysis and calculation of	The system shall calculate replacement costs by tracking current or forecasted values. The system shall also be capable of performing life cycle

	replacement costs of asset	cost analysis to maintain a balance between system reliability and cost incurred over the assets life cycle and to facilitate decision to continue with maintenance of the asset or replace the same.
AM.41	Generation of capital asset activity report	The system shall have the ability to produce capital asset activity reports by agency, asset class and fund source.

3.3.10 Maintenance Management

Objective : For better planning and co-ordination of various maintenance activities, reduce breakdowns by inculcating the culture of preventive and predictive maintenance, to maintain maintenance history, to review and control maintenance costs and providing a feedback to management for timely decision making.

Requirement ID	Functionality	Description
MM.1.0	**General Features and Scope of Work: -**	
MM.1.1	Coordination Between various Maintenance Works	Ability to provide a means to co-ordinate various maintenance work being planned (e.g.corrective, preventive, breakdown and predictive maintenance related work).
MM.1.2	Printing of shutdown notices	Ability to print shutdown notices for potentially affected customers and integrate with Customer Care System, which can send SMS/email/notification to such customers automatically. System shall also have ability to print excavation permits for underground works for the purpose of attending cable faults and related Maintenance activities.
MM.1.3	Review of planned Maintenance works	Ability to review any outages/overhaul/shutdowns being planned, and the maintenance work planned to be performed during that period.
MM.1.4	Support for predictive maintenance	Ability to support Predictive Maintenance, where specific equipment data (e.g. noise level, meter reading, abnormal temperature at line jointsetc.) can be recorded and monitored for automatic creation of maintenance work order, in case certain event occur (e.g. meter reading is at danger level).
MM.1.5	Forecasting of future corrective works	Ability to support the forecasting of future corrective work for next 12 months (user-definable period). Ananalysis of historical work will be used to forecast future corrective work. Such an exercise would likely include an analysis of the incidence of certain classes of failures, analysis of causes of failure etc.
		Ability to automatically trigger the creation of Work Orders for single equipment or group of

MM.1.6	Automatic creation of work orders	equipment's based on equipment condition monitoring results, maintenance strategies and associated criteria. These Work Orders should in turn be based on a Standard Job capable of storing all job requirement information.
MM.1.7	Flagging of statutory works	Ability to flag work units created for statutory or regulatory reasons.

MM.1.8	Automatic generation of WO after expiry of warranty	Ability to generate work orders automatically when a particular asset's warranty is soon to expire. This would be used to trigger maintenance checks / inspections prior to the warranty expiring.
MM.1.9	Forecasting of planned maintenance jobs	Forecast Maintenance Activities - Ability to forecast planned / preventive maintenance for next 12 months (user-definable period) based on maintenance strategies / triggers. The forecast should apply both time and operational/ conditional triggers to predict, 'when' maintenance activities will be required.
MM.1.10	Automatic creation of WO as per maintenance schedule	Ability to schedule maintenance plan for automatic creation of work order, based on : - Time (calendar date or fixed time interval) - Activity (counter based) - Time and activity based on whichever is earlier basis.
MM.1.11	Time based creation of WO	Ability to maintain time-based criteria for the creation of work units. This refers to maintenance strategies basedon time (e.g. Perform statutory inspection every twelve months).
MM.1.12	Usage based creation of WO	Ability to Maintain Usage Based Criteria for the creation of work units. This refers to maintenance strategies based on equipment usage (e.g. Perform circuit breakermaintenance every 500operations).
MM.1.13	User defined creation of WO	Ability to maintain user defined maintenance criteria for the creation of work units. Any special maintenance strategies defined by users.
MM.1.14	Automatic generation of schedule, priority etc.	Ability to automatically generate a recommended schedule / shift pattern based on work order due dates, work order priorities / criticality, resource availability, Feeder / location / geography. Also, ability to automatically schedule down to work crew level triggered preventive maintenance work orders and Priority jobs.
		Ability to identify opportunity maintenance. Opportunities arise through: - Review of outstanding work orders on specific items of equipment

MM.1.15	Identification of opportunity maintenance jobs	- Examination of the work' mode' that identifies the outage requirements for the work and consequently the down-stream activities that can be performed. - Review of condition monitoring data for the equipment and 'related' equipment. - Review of future preventive maintenance tasks. - Review of location of work and identification of work, which may be performed within a geographical area

MM.1.16	Creation of short/medium term planning	The short to medium term maintenance planning horizon is on a monthly basis and should be approximately at least 12 months long. Ability to support the update of the plan on a regular basis.
MM.1.17	Resource planning and review	Ability to review resources available compared with resources required to undertake the work. Resources may be either individual skills or work groups (e.g. teams / crews) or special tools &tackle. Also, ability to identify resource shortfalls in suggested schedule.
MM.1.18	Search inquiry on Work request and WO	Ability to inquire on Work Request and Work Orderthrough inbuilt system searches.
MM.1.19	Location of WO on customer reference	Ability to use a customer reference to locate a Work Request or Work Order and ascertain progress.
MM.1.20	Graphical depiction of online schedule	Ability to graphically depict and manipulate online schedules in the form of GANTT charts by multiple variables including: - Period - Date (Between two dates) - Time (Days/Hours/Weeks/Months/Years) - Work Group/Branch - individual - Work Order Type (preventive, corrective, fault type) - Work Order Relationship (Parent, Child, Peer to Peer) - Skill or Resource - Location - Tools - Equipment/Plant
MM.1.21	Creation of snap shot of schedule	Ability to take a 'snap-shot' of the schedule for the purpose of forwarding the schedule to the appropriate person (supervisor) to review and approve via workflow.
MM.1.22	Creation of customer appointment schedule	Ability to schedule work for customer appointments (generally for new connections) allowing for several appointments per day by either an individual or crew. Such calls will initially be recorded in the BESCOM Call Centre.
MM.1.23	Rescheduling of planned	It should also be possible to change the planned execution date for the maintenance work while providing a means to co-ordinate all related works at a

	works	particular location and time.
MM.1.24	Creation of bulk schedule	Ability to bulk schedule and bulk approve.
MM.1.25	Creation of bulk schedule and slip schedule	Ability to bulk reschedule and slip schedule (i.e. Remove work from the schedule and move to open periods), e.g. cater for storms and other high priorityevents. This should be able to be performed graphically by dragging and dropping GANTT chart objects. Scheduling should be allowed across districts, and/or divisions, sub divisions, work groups, types or grouping of assets.

MM.1.26	Creation of Inspection work parcels	Inspection work will be sub-divided into manageable parcels using the asset relationships held within the GIS system (either by polygon or network). Work parcels will be prepared by nominating the inspection activities to be applied to the asset. Inspection tasks will be required to be held as standard jobs in the maintenance Management system.
MM.1.27	Downloading of inspection work parcels	Ability to download inspection work parcels into a format readable by work crew, who perform the inspections.
MM.1.28	Generation of work parcels based on network activity	Ability to generate work parcels by nominating a network activity to be applied to the asset. The subsequent work will be required to be held as standard jobs in the maintenance management system.
MM.1.29	Forecasting and planning for labour requirements	Ability to forecast labor requirements and support labour planning in terms of both quantities and skills based on work forecasts. Labour planning would include structure and size of work crews, individual skills and involve analysis of worker leave patterns.
MM.1.30	Forecasting and planning for contractor requirements	Ability to forecast contractor requirements and support contractor planning based on work forecasts.
MM.1.31	Forecasting and planning for T&P requirements	Ability to forecast maintenance plant/ tool requirements and support maintenance plant / tool planning based on work forecasts.
MM.1.32	Forecasting and planning for material requirements	Ability to forecast materials requirements and support materials planning based on work forecasts.
MM.1.33	Work plan as a series of work parcels	Ability to hold the work plan as a series of work parcels tied to specific time period - i.e. Months, Weeks etc.
MM.1.34	Updation of long term plans	Ability to update the long-term plan for a business division or department.
MM.1.35	Tracing of movement	Ability to trace movement and usage. History of the movement of traced components will be performed largely automatically. The allowing details will be maintained / available: - Acquisition details (order no, date and price);

	and usage	- Issue details (requisition no and date); - Installation details (equipment identifier, date installed and removed); - Repair details (technical description,costs, dates, operating statistic e.g. hours); - Operational and condition statistics of installed equipment (e.g. failure rates, outputs, vibration results, oil samples etc.)
MM.1.36	Integration with Materials, HR and Finance	Ability to integrate with the Materials, HR and Finance management system in future.
MM.2.0	**Work Requests**	

MM.2.1	Creation, review and deletion of work requests	Ability to create, maintain and review work requests and delete them if they are not required.
MM.2.2	Creation of Work requests	Ability to raise maintenance Work Requests after receiving notification from operations about a breakdown. The Work Request should then be capable of actioning / triggering electronic notification to themaintenance supervisor.
MM.2.3	Capturing of all job requests	Ability to capture maintenance job requests from a variety of groups and systems in addition to Operations, Maintenance personnel of BESCOM, which includes external customers via the Internet, Fax, letter Telephone or Modem through the BESCOM interfacing Systems/Call centers.
MM.2.4	Search capability for all work requests	Ability to easily review / search for equipment related Work Request and/or any other Work Request problem e.g. graphical, Colloquial searches for equipment IDs, drop down menus for selectable fields and sizeable descriptive fields for recording job/fault information.
MM.2.5	Classification of work requests	Ability to classify Work Request/Work Order by user defined variables. For example safety, modification, new work, rework, breakdown, preventive etc.. It should be possible to report by each of these classifications.
MM.2.6	Prioritization of work requests	Ability to assign a priority to a Work Request.
MM.2.7	Ability to view any work request	Ability to view details of any outstanding Work Requests on a specific job or related piece of equipment in order to avoid duplicating work requests. Also, ability to link / reference a Work Request against a customer reference or location.
MM.2.8	Status of a work request	Ability to record the status of a Work Request via user defined variables e.g. Awaiting approval etc.
MM.2.9	Feedback to requestor	Ability to inform requestor via e-mail or otherwise upon approval / rejection of Work Request.
MM.2.10	Automatic creation/ linking	Ability to automatically and manually create

	of WO to a work request	/ link Work Orders to a Work request.
MM.2.11	Transfer of information from work request to WO	Ability to transfer (manually or automatically) information captured within a Work Request directly into a Work Order fields e.g. Job Type. Once entered in the Work Order, it should be possible to alter this information e.g. fault description.
MM.2.12	Establishment of Service level targets	Ability to establish Service Level targets against a Work Request. These targets could be time, financial and/or quality based. The ability to report on these targets should also exist.

MM.2.13	Defining of work	Ability to clearly define work, in terms of attributes (nature, type, driver etc), By populating fields and allowing user to enter a suitable long/shorttext description.
MM.2.14	Defining of critical dates	Ability to define critical dates against a Work Request. e.g. Required By date.
MM.2.15	Approval to closure of request online	Ability to approve, maintain, complete and close Work Request online.
MM.3.0	**Work Orders**	
MM.3.1	Creation, review and deletion of WO	Ability to create, maintain and delete Work Orders.
MM.3.2	Creation of Work orders	Ability to create a work order for all types of work by estimating the job duration, resource requirements,material requirements, contractor requirements and allocate a work priority and mode to the request. The mode refers to the requirement for and type of 'outage'. The work order shall also identify the labor type and/or crew(s) allocated to the work, description of the work and the duration of the work. It is likely that for Emergency work, the Work Order details could be provided in via anelectronic interface.
MM.3.3	Generation of WO number	The Work Order reference number should accommodate existing numbering and naming conventions used by BESCOM
MM.3.4	Linkage of WO with account code	Ability to link a Work Order to a financial account code.
MM.3.5	Defining of critical dates for a WO	Ability to define critical dates against a Work Order e.g. Required By date, planned start date, planned end date, job duration etc.
MM.3.6	Format of a WO	The Work Order details should include but not be limited to: ➢ Work Order type (e.g. corrective, preventive,break down etc.) ➢ Sub categories within a Work Order type ➢ Detailed description ➢ Work Order tasks

		➢ Planned start/end date and duration for work Asset object requiring attention (e.g. equipment, function, location) ➢ Work instructions/tasks ➢ Any safety procedures ➢ Material (spare parts,stock and non stock items) required ➢ Estimation of manpower (internal and externallabor) requirement ➢ Labor skill level ➢ Work permit ➢ Planned cost ➢ Cost center/project code etc

MM.3.7	Linking of WO	Ability to link/reference a Work Order against a piece or group of equipment, customer reference or location.
MM.3.8	Creation of multi WO tasks	Ability to create multiple Work Order tasks against a Work Order.
MM.3.9	Defining of work requirements	Ability to define work requirements (plan/ labour/ equipment/ other) against the Work Order.
MM.3.10	Review of WO priorities	Ability to assign and review Work Order priorities.
MM.3.11	Postponement of WO	Ability to postpone Work Orders to a certain date or to a specific shut down period.
MM.3.12	Ability to change a WO	Ability to make changes to a Work Order (e.g. change maintenance steps, change materialrequirements, change labour requirements).
MM.3.13	Ability to view details of a WO	Ability to view details of any outstanding Work Orders on specific or related pieces of equipment.
MM.3.14	Recording the status of a WO	Ability to record the status of a Work Order via user defined variables e.g. on stand-by awaiting materials, partially closed, closed etc.
MM.3.15	Generation of WO based on maintenance triggers	Ability to generate Work Orders based on maintenance triggers. Work Orders for Preventative Maintenance tasks may be generated in the following ways: ➢ Automatically ➢ Automatically requiring approval /authorization Manually
MM.3.16	Automatic waival of a WO	Ability to automatically identify and waive a Work Order, if a previous activity has already taken place that satisfied the work requirement.
	Online	The ability to approve work orders on-line via workflow is required. This could be performed by different incumbents within the

MM.3.17	approval of WO	organization, depending on work order size/cost, priority, mode and Delegated Financial Authority levels etc. If a work order is not approved within a specified time, it should be forwarded to the next appropriate person.
MM.3.18	Closure of WO online	Ability to maintain, complete and close Work Orders online.

MM.3.19	Adjustment in WO	Ability to adjust all elements of the Work Order including: ➢ Materials ➢ Resources ➢ Tools ➢ Timings
MM.3.20	Creation of an emergency WO	Ability to create and issue an emergency Work Order that does not require approval. An audit trail will record the user who authorized the Work Order.
MM.3.21	Review of maintenance history	Ability to review maintenance history for a specific item of equipment and/or on a particular manufacturer based on Work Order history.
MM.3.22	Attachment of documents to a WO	Ability to attach documents to a Work Order including detailed work instructions, safety requirements and checklists, drawings etc. Upon issue of a Work Order, it should be optional as to whether attachments are printed automatically or at the discretion of the user.
MM.3.23	Review and printing of tech information	Ability to review and print any technical information Associated with the work parcel.
MM.3.24	Status on warranty	Ability to check whether there are any current warranties on the equipment, or 'related' equipment. This will require a link to the equipment database where all warranty information will be kept.
MM.3.25	Bulk creation of WO	Ability to create Work Orders in bulk using a pre- selected set of fields.
MM.3.26	Bulk updation of WO	Ability to bulk update information for a number of Work Orders.
MM.3.27	Search criteria on group of WO	Ability to specifically target a group of Work Orders during a search - based on Work Order fields populated by the user.
MM.3.28	Viewing of bulk WO	Ability to view bulk Work Order information and manipulate this information based on user requirements. These modifications should include filed/code updates and/or

	information	generic description/ information input into theWork Orders description / extended description.
MM.3.29	Issue of warning / alarm in case of non completion	Ability to notify relevant personnel or Issue a warning/alarm, if a Work Order has not been completed after certain period of time.

MM.3.30	Generation of work permit requisition	Ability to generate a requisition of permit in order to isolate equipment's for maintenance.
MM.3.31	Status of permits	Ability to identify all permits issued/outstanding in relation to a particular piece of equipment or groups of equipment.
MM.3.32	Automatic creation of resource requisition	Once work has been scheduled requisitions are automatically raised for materials and contractors. These requisitions should not require additional approval i.e. Once the work order is approved all related business objects that require approval should be approved.
MM.3.33	Automatic dispatch of work to crews	Ability to dispatch work to crews automatically(Manually function should be able to overwrite the automatic function.) based on user defined criteria.
MM.3.34	Integration with mobile messaging and CC system	Ability to integrate with Mobile messaging and/or Internet systems for electronic dispatch of work to work groups or crews via the BESCOM Customer care system.
MM.3.35	Modification in work crew / teams	Ability to create, review and modify the structure and make-up of the work teams / crews including skills and competency requirements.
MM.4.0	**Standard Jobs**	
MM.4.1	Creation of standard jobs	Ability to create, retain and use standard jobs including specification of tasks, materials requirements, labour, hours and skills and contractor hours and skills, in-house and outsourced tools / plant requirements, outage requirements, priorities, accounting information etc.
MM.4.2	Creation of standard jobs for specific equipment's	Ability to create standard maintenance jobs for activities involving specific equipment, specific 'classes' or 'groups' of equipment or some 'general jobs.
MM.4.3	Creation of standard jobs for specific conditions	Ability to use standard jobs to create Work Orders resulting from condition results.

MM.4.4	Creation of standard Jobs for scheduled tasks	Ability to use standard jobs to create Work Orders for work originated from Maintenance Scheduled Tasks.
MM.4.5	Classification of standard jobs	Ability to classify standard job. Due to the anticipated number of standard jobs, an easy-to-use classification system for standard jobs/Work Orders is required. For example, this system may be dependent on the equipment hierarchy, equipment class, location etc.

MM.4.6	Isolation requirement for a standard job	Ability to link a standard job to any isolation procedures required (e.g. need to shutdown certain part of a plant).
MM.4.7	Linkage of documents to a standard job	Ability to link to a standard job(s) any required documents including technical information, safety instructions, method sheets, checklists etc.
MM.4.8	Tasks during a standard job	Ability to specify the type of tasks that will be performed during a standard job.
MM.4.9	Linkage of safety documents to a standard job	Ability to link a standard job any required safety instructions. Linkage is also required to be maintained to Safety procedures within externally maintained documentation.
MM.4.10	Linkage of inspection checklists to a standard job	Ability to link a standard job to any inspectionchecklists.
MM.5.0	**Backlogs**	
MM.5.1	Viewing of backlogs	Ability to view all work, review the backlog, and availability of resources to see which of the jobs can be absorbed into the current or next schedulable period(s). All work, including backlog, should be able to be reviewed by user-defined codes e.g. Fault type.
MM.5.2	Graphical representation of backlogs	Ability to graphically indicate all backlog work.
MM.5.3	Actioning on backlog work	Ability to bulk re-schedule, cancel, close or postpone backlog work.
MM.6.0	**Work Flow Functionality**	
MM.6.1	Work flow tracking function	Ability to perform work flow and job tracking functionalities.
	Structuring of	The Work flow functionality should be able to

MM.6.2	workflow as per BESCOM	be structured according to BESCOM business processes.
MM.6.3	Graphical representation of a process	Ability to provide a graphical representation of a process in terms of: - Roles - Tasks - Tools - Processes

MM.6.4	Definition of process rules with help options	The work flow functionality should be able to define process rules with help options from drop down lists.
MM.6.5	Creation of work units & linking with equipment	Based on certain process options and actions, the work flow function should be able to create work units and link them to appropriate equipment information.
MM.6.6	Creation of work flow related jobs	Ability to utilize standard jobs and job estimates in the creation of Work Flow related jobs/work parcels.
MM.6.7	Automatic alert options in a work flow	The work flow should be able to automatically alert ornotify on : - Tasks completion - Approval - Exceed Service Levels
MM.6.8	Prioritization	Ability to priorities work - automatically And manually.
MM.6.9	Conductance of statistical analysis	Ability to conduct statistical analysis such as: average time to complete, average workload (by individual and work groups) etc.
MM.6.10	Providing support in work steps and control elements	Ability to support work steps and control elements such as: - Sending & editing messages - Scheduling - Creatingtext documents &notes - Setting & monitoring deadlines - Escalation of overdue activities etc.
MM.6.11	Interface with fax-on-demand	Ability to interface with fax-on-demand systems.
MM.6.12	Ability to support Electronic signature	Ability to support electronic signature for Document approval
MM.7.0	**Work Sign Off**	
MM.7.1	Mandatory recording of maintenance history data	Ability to record the maintenance history data against a component/equipment that has had a work order raised against it. It should be possible to make this field mandatory i.e. A job cannot be closed unless this field has been entered.

MM.7.2	Capturing of all information for a completed work	Ability to capture all information relating to completed maintenance work against a work order as part of the maintenance history database. Retain the information as part of the maintenance history unless it is physically removed from the system (e.g. through archivingexercise).

MM.7.3	Recording the return of unused materials	Ability to record the return of materials that were issued against the work order, but they were then not used.
MM.7.4	Recording the delayed completion on a/c Of materials	Ability to record the fact that the work has been delayed due to the materials not being available in time. This will be used to evaluate the material planning procedures.
MM.7.5	Recording the delayed completion on a/c of labour	Ability to record the fact that the work has been delayed due to insufficient labor resources. This will be used to evaluate the scheduling procedures.
MM.7.6	Recording the delayed completion on a/c of permit to work	Ability to record the fact that the work has been delayed due to Lack of permit issue or any other user definable fields.
MM.7.7	Bulk closure of WO	Ability to bulk close Work Orders meeting a user defined time, cost, resource, status or other criteria.
MM.7.8	Automatic closure of WO	Ability to close Work Orders automatically once the last Work Order Task has been completed.
MM.7.9	Authorization to enter comments against WO	Ability to allow authorized employees to enter text in a free format against the Work Order. These comments should be able to be forwarded to maintainer's supervisor.
MM.7.10	Flagging WO for cost escalation	Ability to flag/warning work orders where the workorder cost exceeds the work estimate / budget for the month/year or user defined approval limit.
MM.7.11	Automatic flagging of outstanding orders	Ability to automatically flag outstanding orders/costs when attempting to close a Work Order.
MM.7.12	Attachment of user defined codes	Ability to attach user defined codes to work orders upon closure e.g. fault type.
MM.7.13	Complete closure of WO	Ability to completely close off work order. System should inform user that all outstanding commitments and invoices have been met. After this step, no more costs can be charged to the order.
		Ability to archive Work Orders after a defined

MM.7.14	Archiving of WO	period of time. It should be possible to easily retrieve archivedWork Orders within few hours.

MM.7.15	Resetting of any time based or usage-based triggers	Any associated time based or usage-based triggers shouldbe reset, if the related work has been completed. "Completion" should be user defined e.g. Partially closedWork Order. The system will then begin to schedule the next predictive or preventative maintenance Work Order.
MM.8.0	**Maintain Bill of Materials**	
MM.8.1	Maintaining parts list	Ability to maintain the parts list contained in the equipment. The list should also include the quantities of parts involved. Ideally a graphical parts book Referenced to the catalogue would support this.
MM.8.2	Maintaining history of changes in parts list	Ability to maintain history of changes to Part List. From time to time equipment I reconfigured with alternative parts. History of such changes is required to be kept.
MM.8.3	Maintaining reference to catalogue	Ability to maintain reference to catalogue. For each partin the equipment parts list, there is a requirement to include a cross- reference to the catalogue, to enablematerial identification and reservations.
MM.8.4	Maintaining document identification and contents	Ability to maintain the document identification and document contents in the document register. Ability to maintain any links between documents and any Equipment/ Component items.
MM.8.5	Maintaining drawing identification and contents	Ability to maintain the drawing identification anddrawing contents in the drawing register. Ability to maintain any links between drawings and any Equipment/Component items. It also desirable to have the ability to markup/red line drawings on the user's screen and email the changes to an officer responsible for updating the document.
MM.8.6	Creation of asset	When an equipment item/ component is created, it is required to reference the item /component to an asset in the fixed assets register. Wherea relevant asset hasn't been set up, it is expected that thesystem would require the creation of an appropriate asset.
MM.9.0	**Maintain Vendor Supplied Information**	
MM.9.1	Recording of vendor recommendation skill requirement	Ability to record the vendor recommended skills requiredto maintain the equipment/component.

MM.9.2	Recording of vendor recommendation performance	Ability to record against the equipment/component vendor recommendations for how It will perform.
MM.9.3	Recording of vendor recommendation operating conditions	Ability to record against the equipment/component vendor recommendationsfor the conditions under which it should be operated.

MM.9.4	Maintaining history of changes to above recommendations	Ability to hold history of changes to recommended performance / operational specifications.
MM.9.5	Maintaining the warranty details	Ability to record the warranty duration, the warrantyperiod end date, the warranty number and any warranty notes. If a WO is raised on an asset under warranty, the system should flag that the vendor is responsible for repairs and that maintenance is required to be performed in accordance with warranty supply and contract conditions.
MM.9.6	Recording of vendor recommendation maint. freq, type, procedure etc.	Ability to record the maintenance frequency, type and procedure recommended by the vendor.
MM.9.7	Maintaining history of changes to above recommendations	Ability to hold history of changes to the recommended maintenance frequency, type and procedure.
MM.9.8	Recording of environmental issues	Ability to record any environmental issues or regulations required in the operation of the equipment / asset.
MM.9.9	Maintaining the useful life details	For the purpose of repair / replacement decisions, it is required that the individua items useful lifebe maintained.
MM.10.0	**Analyze and Report**	
MM.10.1	Reporting of total cost and quantity	Ability to report the total costs and quantities for a particular job. Ability to drill down into the Work Order for a more detailed breakdown including an analysis of internal and external labour, materials and other costs.
MM.10.2	Performance of standard job against estimate	Ability to analyze the performance of standard jobs against the estimates contained within it. The job costs and quantities should be able to be broken down by work crew.
	Analysis of	Ability to list the amount of time taken to

MM.10.3	time taken to complete against estimated duration	complete a Work Order for making comparison against the planned / estimated duration. This time analysis should be able to be classified by work type or Work Order classification and be broken down by work crew.
MM.10.4	Listing of total cost due to issue of materials	Ability to list the total costs incurred due to issue of material to Work Orders. The material could either be store issue or direct purchase issue. This report could be against a specific equipment or against a cost center.
MM.10.5	Listing of total cost due to contractor cost	Ability to list the total costs incurred due to contractor work charged to Work Orders. This would include any contractor overheads. This report could be against anitem of equipment, a cost center, a contractor, an equipment ID etc.

MM.10.6	Graphical display of resource and utilization factor	Ability to measure and report on resource and utilization factors. This should include graphical displays and/or Tabulated data.
MM.10.7	Ability to review backlog WO	One component of the planning performance is to keep the backlog of jobs to a minimum, therefore the ability to review backlog Work Orders is crucial.
MM.10.8	Listing of outstanding & incomplete WO	Ability to list the outstanding Work Orders that have not been completed by their estimated due date.
MM.10.9	Reporting on status of Preventive works	Ability to report on all Preventive maintenance work that has been missed rescheduled or postponed.
MM.10.10	Listing of WO completed during a shut down period	Ability to list all Work Orders completed by a work group during the shutdown period. It should be able to compare this summary with the total number of Work Orders scheduled for completion during this period.
MM.10.11	Listing of delayed WO	Ability to report on Work Orders that have been delayed due to: - Materials not being available in time for the maintenance work; - Insufficient internal / external labour resources; - Lack of permit being issued; - Other user defined fields.
MM.10.12	Comparison between planned and unplanned works	Ability to compare the amount of planned work (Preventative) to the amount of unplanned work (breakdown or corrective) over a set time period.
MM.10.13	Comparison of cost between preventive and other work	Ability to compare the costs of preventative work to corrective and modification work incurred over a settime period.
MM.10.14	Analysis of historical work	Ability to support the analysis of historical work to assist in the estimation of future work and resource requirements.

MM.10.15	Ability to record status of a WO	Ability to record status of a Work Order such as approved, not- approved, wait on materials, wait on contractors, wait on labour, held etc.
MM.10.16	Capturing of Work progress of a WO	Ability to capture work progress including: - Internal labour hours performed on each task and resultant charges - Hourly hire contractor hours performed on each task and resultant charges - Material charges based on issue - Contractor charges from invoice entry - Plant charges

		- Completion of tasks and closure of Work Orders Manually derived % complete for each task orWork Order
MM.10.17	Reporting on asset maintenance history	Ability to report on an asset's maintenance history based on Work Orders raised against it.
MM.11.0	**Analyze and Report asset performance**	
MM.11.1	Viewing of maintenance cost	Ability to display the maintenance costs for a range of equipment/ components. This will enable the user to review all costs incurred during the life of an asset including labor, materials, contractors costs etc.
MM.11.2	Reporting of common failures & repair times	Ability to report common equipment failures and repair times based on fault codes.
MM.11.3	Review of any notes on equipment	Ability to review any notes about the particular equipment/ component, which have been entered by maintenance experts. The notes should be accessed from the particular equipment/ component record.
MM.11.4	Analysis and report on MTBF	Ability to analyze and report the mean time between failure (MTBF) or an item of equipment. It should be able to be summarized for any particular equipment or a group of equipment. In addition, the 'time between failure' should be able to be replaced by usage statistics Between failure.
MM.11.5	Analysis and report on MTTR	Ability to analyze and report the mean time to repair (MTTR) for an item of equipment. This involves calculating the average of the work order duration's for an item of equipment. Alternatively, it could be an average of the recorded downtimes.
MM.11.6	Reporting on frequency of failure.	Ability to report how many times an item of equipment has failed within nominated time periods (Frequency of Failure).
MM.11.7	Assessment of failure probability.	Ability to determine from the historical data the probability of failure over a set time period.

MM.11.8	Assessment on affect of failure	Ability to display what affects the failure of anequipment/ component. This will then help to determine how critical it is that this equipment/ component does notfail.
MM.11.9	Statistics on cause of failure and its effects	Ability to produce statistics linking the cause of failure and the effects of the failure.

MM.11.10	Graphical mapping of rate of failure	Ability to map (graphically) how the rate of failure changes with different work load, by equipment/group of equipment. It would be used to assist in determining the optimal workload.
MM.11.11	Graphical analysis of fault	Ability to report equipment / group of equipment downtimes over a particular period of time including analysis of fault (Graphically).
MM.11.12	Review of age, maintenance history & working life of equipment	Ability to assist in the reviewing equipment/component age, maintenancehistory, and recommended working life to determine if it will be able to meet the requirements of the operations/ maintenance departments.
MM.11.13	Assisting in making replacement decision	Ability to assist in the decision to retain an item in its current state, replace the item, or modify it based on future usage, estimated maintenance costs, average downtime etc.
MM.11.14	Review of maintenance work and highlighting any defects of recurring nature	Ability to review maintenance work performed on equipment and highlight regularly occurring defects in specific types/designs of equipment. The report should be able to be run based on user defined parameters such as equipment ID, make / model, defect code etc.
MM.11.15	Simulation of life cycle maintenance costs	Ability to simulate the life cycle maintenance costs for an item of equipment, when different operational conditions and maintenance strategies are entered as parameters.
MM.12.0	**Reporting and On-line Inquiry**	
MM.12.1	Defining criteria for data extraction	Able to define criteria for extraction of data.
MM.12.2	Defining security rules for data extraction	Able to define security rules for data extraction.
MM.12.3	Comparison of historical and actual data	Able to compare historical data to actual data based on user defined period (e.g.

		monthly, quarterly, yearly).
MM.12.4	Comparison of target and actual data	Able to compare actual data to Target / budget data based on user defined period (e.g. monthly, quarterly, yearly).
MM.12.5	Defining formula for data formatting	Able to define formula for formatting data i.e. metric conversion, quantity count, percentage calculation and arithmetic calculation.
MM.12.6	Tracing of summarized information	Able to provide drill down functionality to trace summarized information to source data/transaction.

MM.12.7	Performing of scenario analysis	Able to perform "what if" or scenario analysis on report data.
MM.12.8	Selection of level and volume of data	Able to select the level of details and volume of data for reporting
MM.12.9	Defining criteria for filtering data	Able to define criteria for filtering data subject to security rules.
MM.12.10	Generation of reports-1	Able to generate reports: - One at a time, - Multiple reports at a time - Ad hoc and regular reports together
MM.12.11	Generation of reports-2	Able to generate reports at: - Real time / on line basis. - In background (when evaluation is time-consuming). - Via over night batch - Specific date - Regular time interval
MM.12.12	Creation of user defined reports	Allow creation of user-defined reports without the need for technical skills.
MM.12.13	Defining report layout and graphical representation	Able to provide flexible reporting tools for defining report layout and type of graphical representation.
MM.12.14	defining personalized report menu.	Able to define personalized report menu.
MM.12.15	Restriction in report selection	Able to restrict report selection based on security of database, organization structure, group.
MM.12.16	Provision of flexible report writer	Provide flexible Report Writer with the following minimum features : ➢ Specify the format and layout of reports; Summaries and total the information tobe reported; Select records to be included in the report; ➢ Select details from each record to be included; ➢ Sort the information to be reported as one

		levelwithin another; ➢ Perform arithmetic calculation on the information selected or totals thereof; ➢ Ability to add narrative comments to reports ➢ Store the report format for later use; and Produce reports in graphical form for presentation purposes.
MM.12.17	Downloading of reports	Able to allow downloading of reports to standard PC applications (e.g. MS Excel spreadsheet, MS Project, MS Word, MS Works etc)

MM.12.18	Outputting of reports	Able to output reports in various media: - screen - printer - electronic media
MM.12.19	Prioritization of reports	Able to prioritize reports for processing.
MM.12.20	Defining distribution list	Able to define distribution list for each report.
MM.12.21	Electronic distribution of reports	Able to distribute reports electronically to other users: Automatically upon completion At preset time
MM.13.0	**Cost Control**	
MM.13.1	Costing of internal maintenance work hours	Ability to cost internal maintenance work hours to the work parcel. The value should be a multiple of the hours and a predefined standard charge rate.
MM.13.2	Costing of contractor Work hours	Ability to cost contractor hours to the work parcel. The charge rate should be contained in an established agreement with the contractor. It shall also have ability to record other contractor charges, such as overheads, costs of using contractor owned equipment, or costs of using contractor materials etc.
MM.13.3	Reconciliation of Work hours	Upon receipt of contractors invoice it should be possible to reconcile hours against those appearing on the W/O.
MM.13.4	Recording of all costs towards materials/ spares	Ability to record all costs towards materials/spares etc. against a work Order
MM.13.5	Costing of T&P based on work hours	Ability to cost equipment, plant and tools to Work Orders based on hourly rates.
MM.13.6	Recording of actual work hours on an on-line time sheet	Ability to allow the recording of actual worked hours on an on-line timesheet. It should be possible to enter the timesheet data by individual employee, work group, work crew or by Work Order.
MM.13.7	Interfacing with Financial system	Ability to interface with financial system via the referencing/linking of the Work Order to an account code. There should be an option to link all transactions booked to the Work Order to a transaction file for examinations

		of costs and dates of incurrence.
MM.13.8	Validation of timesheet data	Ability to validate entered timesheet data including: ➢ Employees (validate against crews and individuals scheduled to the work); ➢ Work Order no (validate against Work Order no and status e.g. closed for actual)

MM.13.9	Forwarding of input timesheet via workflow	Ability to forward, through Work Flow, the input timesheet to the appropriate approving officer for certification.
MM.13.10	Ability to manually key in WO expenses	Ability to allow for manual keying in of Work Order expenses.
MM.13.11	Allocation of cost to different WO	Ability to allocate (manually and/or automatic;individually and/or in bulk) cost to different Work Orders and asset types (e.g. contractor fees).
MM.13.12	Costing of individual transaction in a Work order	Ability to drill down from Work Order or job toindividual cost transactions.
MM.13.13	Comparison of WO actual cost vs budget cost	Ability to show Work Order actual costs versus budgetand forecast.
MM.13.14	Generation of alarm on cost escalation	Ability to generate an alarm when Work Order expenses reach a user defined limit.
MM.13.15	Online viewing of cost	Ability to view (on-line) cost information for the purpose of checking and monitoring progress.
MM.13.16	Checks on cost transfer	Capable of performing checks to ensure that cost can only be transferred based on approved criteria (e.g. that the job to which the cost is to be transferred to is a valid job).
MM.13.17	Prevention of cost transfer against closed jobs	Ability to prevent cost transfers against closed jobs.
MM.13.18	Security Checks on cost transfer	Ability to establish security measures to control the transfer of costs.
MM.14.0	**Data Capturing and Extraction**	
MM.14.1	Capturing of statistical data	Able to capture statistical data from ➢ Manual entry ➢ External electronic media ➢ Interfacing with external databases
MM.14.2	**Integration with Other Systems**	

MM.14.2.1	Integration with GIS	Integrated to GIS System to identify the nearest substation and to perform load analysis.
MM.14.2.2	Integration with Customer care system	Integrated to Customer Care System to use CCS functionalities and information

MM.14.2.3	Integration with DMS- SCADA/ RT- DAS/ 11kV RFMS/ DT- Consumer AMR based Metering/ Smart Metering/ Net Metering/ Pre-paid metering system	Integrated to DMS-SCADA/ RT-DAS/ 11kV RFMS/ DT- Consumer AMR based Metering/ Smart Metering/Net Metering/ Pre-paid metering System to use functionalities of these systems, ifavailable.
MM.14.2.4	Integration with Asset database	Integrated to Asset Database to use Asset Database functionalities and information.
MM.14.2.5	Integration with ERP	Integrated to i~ERP suite to use ERP functionalities and information.

3.3.11 Prepaid functionality

The prepaid functionality should have the following:

- The system should support pre-payment metering and capability to interface with prepaid application.
- The prepayment should support the system that payment and connection parameters are stored centrally and the details are being updated to consumer portal/ app.
- The system should periodically monitor the energy consumption of prepaid consumer and decrease the available credit based on consumption.
- The system should send connect/disconnect command on the basis of available credit as per notified rules & regulations.
- The system should send low-credit notifications to the consumer when their balance approaches a threshold.
- User interface for utility to update the credit amount of prepaid consumers to the System. Such type of user interface before login shall require password & login i.d. for authentication. User interface after getting information like consumer i.d., mobile number & recharge amount etc. shall update the same to System. The details of payment information shall also update to consumer through SMS, email etc.
- In case of prepaid consumers, consumers can view recharge history & present balance.
- Prepaid consumers shall be provided facility to recharge their

account by logging on user interface. User interface shall require consumer id., mobile number & password for secure login. This user interface shall be integrated with the present online payment gateway of utility.

3.3.12 Feeder information System

1. It is intended that certain parameters pertaining to 11 KV Feeders would be captured by the Feeder In charge / BESCOM Officers for energy audit, performance monitoring,

operation and management. Agency has to provide both mobile app and web interface for entering the required data, capturing the inputs, etc. The utility will facilitate historical data to the successful bidder.

2. The software solution should have a GIS module wherein the consumer information, network asset information, any other information that is captured by the field personnel can be displayed on a GIS map with provision to edit, update etc. The various elements shall be distinctly depicted with different icons / colour etc. The main objective shall be to extensively use this module for depicting the consumer information, assets and for enabling and planning different day to day operation and maintenance activities of the BESCOM. The cost of acquiring the necessary licenses if required shall be factored into the Bid and the same shall be valid during the tenure of the contract and the licenses should be in the name of BESCOM.

3. A mobile app having functionalities to facilitate the field personnel in recording the various network elements for creating the single line diagram shall be provided. The back-end software shall have provisions for depicting the Single Line Diagram with options of expansions of LT network up to consumer level.

4. For capturing the various HT & LT components of the distribution network Feeder wise for creation and depiction in the form of a Single Line Diagram. The module shall facilitate the Feeder manager in accurately mapping the various branches, sub branches and multiple branches as per the actual site data. Provision shall be provided to update, edit/relocate or modify any asset captured.

5. Agency has to develop comprehensive MIS reports and Dashboards depicting the various parameters captured. The Drill down dash boards / MIS Reports shall have data grouping and data agitations at various levels i.e., DTC, Feeder, Sub Station, Subdivision, Division, Circle, Zone and BESCOM level.

6. The bidder shall provide both the mobile app and web module in the software to facilitate the various functionalities of the feeder In-charge. Brief of functionalities but not limited as under:

   a. Provision to assign, reassign, delete feeder to feeder manager.

   b. List the consumers, DTC connected to the feeder.

   c. Provision to enter the feeder reading/consumption at varying intervals for assessing the energy availability, consumption, losses etc.

   d. Provision to enter the DTC reading/consumption manually.

   e. Provision to Add/Modify/Delete the Feeder information like the meter make, CTPT, initial reading, status of meters, supply information etc.

f. The software shall facilitate the Feeder manager in arriving at the energy audit at desired intervals.

g. The Data in the mobile app shall reside local and shall assist the Feeder manager in monitoring the critical parameters without the necessity of actually accessing the central server.

h. The software shall have alerts, dashboards, remainders to give 360-degree view of the energy consumption and related parameters for energy audit and monitoring purpose.

i. Any other input and reporting formats that are required shall be finalized during the execution stage with the selected bidder.

3.3.13 Implementation and integration of BI & Analytical Tools

Overview: As companies are moving towards the digital transformation, more and more data is being created. BI Tool helps to convert this raw data into actionable insights that drives business decisions. BI Tool helps organisation leaders to leverage on this data to get a real-time overview of your business in the form of graphs, charts, summaries, and other informative reports. This helps organisations to make smarter, faster and better decisions. Users can take advantage of advanced features like what-If analysis and statistical analysis to identify the trends & anomalies.

The high-level business objectives of the BI system

1. Data analytics
2. Design and automated dashboards
3. Data management
4. Reporting
5. What-if analysis, actuals-vs-forecasting analysis and trend analysis
6. Integration with third party applications
7. Data mining from multiple data sources

Functional Requirements:

3.3.13.1 Reports:

The fundamental and the most widely used feature of the BI Tool is the ability to generate insightful data in a personalised and desired format. The tool offers the following features:

Ad-hoc reports: The tool provides an intuitive and interactive platform for not only the Engineers and IT Team but also for also for non-technical users so as to easily create and share the reports without the help of BI experts. The tool should provide feature to export the reports generated in various formats like HTML, CSV, EXCEL and PDF formats.

Scheduling of reports: The tool provides both manual scheduling and auto-scheduling of reports. The reports will be auto-delivered to the specific users, be it recurring or one time.

Alerts and notifications: Has an ability to generate alerts and notifications of certain types based on the pre-set condition and the alert/notification can be sent over to the specified user/users via SMS or email or mobile application.

Report management: The tool offers technical users to design and create customised templates out of complex reports that can be used by either the entire organization or a specific group. For end users, support for reformatting to be provided with the limited features.

Formatting: The tool offers the users to reformat the reports. Highlighting cells, texts and labels with different colour based on the conditions being pre-set before generating the reports.

Dynamic views: The tool offers interactive reporting feature which will enable the user to view different types of reports in multiple forms and dimensions dynamically.

3.3.13.2 Data Visualization:

Data visualization is one of the first things that's visible to the users, it's a process that collects the data, processes it for modeling so as to draw a conclusion from the visual information.

Dashboards: The tool allows users to create dashboard to provide either a single snapshot view or multiple views at the same displaying the key performance indicators (KPI), business metrics and critical data points that helps the organization leaders to understand the overall health of their business. These metrics are customizable to meet the specific requirement of a product or a service or a division or a specific group. The dashboard takes the inputs from files, attachments, services and API's and outputs the modeled data in the form of tables, line charts, bar charts and gauges.

Templates: The tool allows the users to create and use templates based on the existing template libraries.

Auto-refresh: The tool offers an automatic refresh of data charts/panels and visualizations in a dashboard at specified intervals. The refresh rate is configurable and can be set by the user in order to fetch the latest data.

Navigation: The tool offers the ability to navigate through the horizontal and vertical paths allowing to browse through the different level of the hierarchical data. Also, with drill-down capabilities, a detailed view is visualized that can be further summed up to highlight the desired points.

Third party tools and packages: The tool offers integration with third party tools and packages to display more meaningful and advanced views and visualizations either through libraries or plug-ins. For an example, the tool supports creating advanced and sophisticated visualizations by using libraries and packages of Python and R programming languages.

3.3.13.3 BI on Mobile:

Following features are supported on the mobile along with the web application. The tool provides most of the features on mobile that's available on the web/desktop application. The tool connects and interacts with the data hosted on both, on-premise data center and cloud server.

Dashboards: The tool offers optimized dashboards, templates and reports with interactive and drill down/up capabilities specially curated for use in mobiles.

Auto-refresh: The tool offers an automatic refresh of charts and visualizations in a dashboard at specified intervals. User friendly settings for mobile users provided.

Hybrid and native mobile apps: The tool should render seamlessly on a variety of devices such as android, IOS, or Windows and different screen sizes.

Alerts and notifications: Alerts to be generated on various different channels like SMS, android/IOS app notifications or e-mail based on whether or not the pre-set conditions are met.

3.3.13.4 Data Management:

The features on Data management are as below:

Data sources: The tool connects to multiple data sources such as Oracle, PostgreSQL, MS SQL server, MS-Access, Cloud database/ODBC and flat files to collect and fine tune as per the user requirement, enabling the user to create meaningful insights in the form of visual reports for further analysis.

Data preparation & modeling: The tool offers to prepare the data through various steps starting from pre-processing, profiling, validating to modeling for the detailed analysis. Advanced data preparation and processing using Python libraries and R programming languages are supported.

Data structuring: The tool provides the ability to explore large amount of data set present in an unstructured format and filter out the various patterns, structures and key points to display them in a meaningful and statistical format as prescribed.

Data blending: The tool provides a feature where multiple data sets can be combined to create a single data-set that can be used for analysis directly or further pushed for processing, should there be a need.

Data querying: The tool offers both basic advanced features like batch updates, complex queries, analysing of the data in the non-volatile memories with the real-time connectivity.

3.3.13.5 Advanced Analytics:

Below are the features present in this module:

Advanced data modeling: The tool allows importing and exporting of predictive data models using PMML, an XML-based predictive model interchange format.

Regression analysis: The tool supports regression analysis, where in the users can analyse the relationship between a set of data that has independent variables and a single dependent variable, generate a model that to make predictions. Various types of regression analysis like linear and exponential are supported.

Statistical analysis: The tool supports various statistical functions like mean, mode, median, skew, variance and standard deviation to name a few to perform statistical analysis of the data-set. Creating new data-set from the existing data-set by applying various formulae and functions is supported.

Cluster analysis: The tool cluster analysis based on various clustering techniques to facilitate advanced segmentation based on the specific requirement leading to the creation of those groups. The tool supports the slicing/dicing of the data along multiple dimensions based on a specific condition and create data groups for further analysis.

What-if analysis: The tool lets users determine the impact on the projected performance due to the changes made based on the assumptions of the previous performance. The tool provides features to compare different scenarios and their potential outcomes based on dynamic parameters or values.

Embedded analytics: In order to let the user focus on a specific use case, the Tool should provide features such as background processing, integration capabilities such as interactive dashboards, reporting, data analysis, and more into embedding an application to enable interactions between web apps and analytics platform.

3.3.13.6 Geospatial Analysis:

Geo-coding and Geo-search: The tool support a feature to forward and reverse geo-coding in order to identify and tag location on the map. Tool offers the Geo-search functionality feature where in the user can find the locations on the go in a map view. All this is achieved with or without the geolocation co-ordinates.

Third party integration: The tool supports integration with third party API providers like Mapbox, Google Maps, Openstreet, etc to map the mappings.

3.3.13.7 Access Rights:

User-specific access: The tool provides role-based access to the BI assets based on their access privileges. Many features and data can be restricted for certain types of users based on their roles in the organization.

Geo-based access: The tool provides location-based access to the BI assets based on their current location. Specific data can be made accessible to the user based on the access privileges.

Read-write access: The tool provides read-write access to the BI assets and reports based on their roles in an organization. Technical/data analysts have the full privilege of creating and preparing the data templates along with the export/download rights, where-as the end users will neither be able to export/download the data nor share it among others. Only read access is provided.

3.3.14 Consumer Information & Service System:

The following indicative requirements with regards to implementation of web portal/ mobile applications to facilitate real time customer services:

1. The Home page shall provide a brief description about the site, the various functionalities it provides and promotional features or any kind of advertisement for special programs can be placed in this page. Login Component is provided and registered users may login using their username and password. New Users can also register by clicking on the First Time Users Register link. The Forgot Password link helps the user to retrieve their password.
2. The Log In page shall ask the registered users for their username and password while the new members can also register through this page.
3. The user is asked for personal, security and account information in this page before registering.
4. The user is asked for his first name, last name, zip code, Date of Birth and his primary email address before being provided with the security question.
5. The new password is sent to the user by email / SMS to his primary email address or registered mobile number as recorded in his profile, on answering the question correctly.
6. Once the user has logged in, he can change his credentials i.e., Username and Password by clicking on the Change Credentials link
7. There should be a “My Accounts” page, which is the landing page for the users with multiple accounts. The screen contains a brief summary of all the accounts such as the account name, address, balance, due date and the account status.

8. There should be a “Single Account” page, which will be the landing page for the customers. The screen contains a description of the account. Any status messages pertaining to the account involving immediate user action is also presented here.
9. There should be a “Consumption History Page” that provides an account of the usage for the last 24 months graphically. A more detailed analysis is provided in a tabular format listing the meter reading date, the reading, consumption, number of days, charges etc.

10. The consumption calculator popup is provided to help the user calculate the usage between any two given dates.
11. The Bill Summary page gives a record of the Billing amounts and Payment made by the customer over the last few months.
12. The user is provided with the options of registering in Online Billing and also continues with paper bills.
13. The View and Pay Bill page presents a short summary of the bill. The user can also view the bill in PDF format by clicking on the link 'View Bill as PDF'.
14. The user is provided with different modes of payment namely Credit Card / Debit card / Net Banking / Mobile Wallet etc. On providing the valid credentials payment can be made directly from the site. The online payment shall be processed through secured payment gateways.
15. There should be provisions for the user to pay multiple bills.
16. There should be a "Manage Accounts" page which shall help the user to manage all his consumer accounts from a single page.
17. There should be a "Service Requests" page that will allow customer to lodge request for services such as new connection, disconnection, load change, name change, category change, meter shifting etc. Depending on the regulatory/utility requirements user is required to submit the documents.
18. There should be a "Service Status" screen which is read only screen which the user can view. Status of various pending requests for the customer such as load change, name change, category change, meter shifting etc. are listed here.
19. Under the "Complaint" page, user can log his complaint using a drop-down menu and also enter some text. A "Complaint Status" page shall provide the user a read only screen to view the complaint status.
20. "Report Power Failure" screen contains static data related to the power failure. The contact number is mentioned in case any power failure occurs. The user calls up the number and reports the power failure and necessary action is taken to restore the power connection.
21. Update Profile screen enables the user to update his/her profile information. The user can edit the personal information and click on Update Changes button to save those changes.

4. **Part-3**: Providing secured INTERNET including associated hardware with appropriate bandwidth to carryout day to day activities smoothly and Stationaries & Consumables.

4.1 Providing secured INTERNET including associated hardware with appropriate bandwidth to carryout day to day activities smoothly: It is the responsibilities of the successful bidder to provide secured Internet of appropriate bandwidth for run the application smoothly and generate all types of reports within reasonable time lines as defined in the tender document. Necessary permission to avail the internet connection at BESCOM premises will be provided by the BESCOM.

4.2 Performance desired for the entire system in the Non-RAPDRP area & future size for next 8 years/Operational Guarantees:

1) Operational guarantees should be given by the Service Provider, and written in the service /support contract / agreement with Service Provider. These include guarantee uptime standards and minimum downtime expected.
2) System response times are dependent upon the hardware and network infrastructure deployed. The Service Provider is to quote for appropriate systems not limited to the tentative specification given with the bid.
3) The Service Provider has to select the suitable hardware so that it meets the performance criteria specified. In case the offered hardware does not satisfy performance criteria as specified below, the vendor has to provide additional equipment's or upgrade the equipment's without any additional cost implication to BESCOM
4) The Service Provider has to offer specific response times as well as specific availability and reliability from its business process automation platform to meet the desired performance level as listed below:
   a) **Screen Operations Response Times:**
      Screen operations response times (end to end) are required of between 1-2 seconds. Screen operation response is defined as the time it takes for all characters to appear on the end user screen from a screen request and for user to get control over the screen.

   b) **Process Operations Response Times**
      i. Non GIS applications
      Process operations response times (end to end) are required:
      - 90% of Online update transactions of 1 - 2 seconds to commit transactions with sub second screen response times.
      - 90% of Online simple query of 2 seconds.
      - 90% of online complex query 3 to 5 seconds.

- Batch/Bulk operation such as customer bill generation, updating of assessed consumption, daily, weekly, fortnightly, monthly, quarterly, half yearly, annually, multi yearly MIS reports, DCB and Energy Audit reports should not be taken more than a minute.
- Response time for processing operations defined as the time it takes for the process to complete from the time it has been requested to run. Peak load currently is between 10 am to 1.30 PM and 2.15 pm to 5.30 pm, mostly with on-line transactions with concurrent users across the project area

ii. **GIS applications**: GIS Application response times are required of at least :
- Schematic presentation with required filters on network components within 2-4 seconds.
- Load background map from Map Server located at data centre within 4-8 seconds (for a case of single user) to 8-15 seconds (for peak load condition, i.e. maximum concurrent users)
- Load High/Low-voltage network on top of background map within 4-8 seconds (for a case of single user) to 8-15 seconds (for peak load condition, i.e. maximum concurrent users)
- Load complete network in a defined area within 5-10 seconds (for a case of single user) to 10-15 seconds (for peak load condition, i.e. maximum concurrent users)
- View properties after loading of schematics within 3-8 seconds
- Creating changes in Customer & network entities (Add/Delete/Edit) in Geo database within 5-10 seconds (for a case of single user) to 10-15 seconds (for peak load condition, i.e. maximum concurrent users)
- Simple query within 2-4 seconds (for a case of single user) to 4-8 seconds for peak load condition, i.e. maximum concurrent users).
- Multiple/Complex query within 5-10 seconds (for a case of single user) to 10-15 seconds (for peak load condition, i.e. maximum concurrent users)

5) While sizing Data centre and DR centre and all its associated components total consumer base /business area of Non-R-APDRP towns of BESCOM and future growth for the next 8 years needs to be considered by Service Provider. While sizing the hardware and

software the annual customer growth rate of 6% need to be considered. The growth rate of users also needs to be considered as 5% per annum while sizing the system. All other parameters contributing to performance of the system shall be considered @5% annual growth.

6) Considering the annual percentage growth and the base figure of Sub-Divisions, Accounting Sections, Consumers in the Non-RAPDRP area which are detailed in the technical specifications, the system designed at both DC and DRC shall meet the specified screen operations response time and the process operations response time.

4.3 During the contract period, the Service Provider shall be responsible for the following and to comply the Cyber Security Guidelines as detailed in the **Annexure - IX**

1) Ensuring that all software upon delivery is free of viruses, trapdoors, and other software contaminants, is purged of all sample scripts and sample code, and all default accounts and passwords removed or disabled. Ensuring complete compliance to Cyber Security rules and norms devised by the country and defined by the Employer by undergoing any additional necessary audits, testing and verification by standard bureaus as indicated by the Employer
2) Before Go-live, compliance report for **OWASP Top 10 Vulnerabilities in 2022** from Cert-In empaneled Cyber Security Auditor shall be submitted to BESCOM.
3) The contractor shall be responsible to provide architecture details, access permission, hardware, bandwidth and apk/firmware/OS files required to the Cert-In empaneled cyber security auditor identified by BESCOM to carry out bi-annual cyber security audit of the IT/OT/IoT system at no additional cost to BESCOM.
4) Vulnerabilities identified in the delivered IT/OT/IoT system during bi-annual cyber security audit carried out by BESCOM shall be mandatorily fixed and compliance report submitted to BESCOM within the timelines defined by BESCOM at no additional cost to BESCOM.
5) Any additional work required to adhere to the guidelines / mandates issued by GOK / GOI shall be carried out by the contractor at no additional cost to BESCOM.
6) Any additional work required to give compliance to or fix the cyber security alerts issued by Cyber Swachata Kendra / Indicator’s of Compromise Advisories provided by NCIIPC on daily basis / CEA/ GOK / GOI shall be strictly adhered / complied to by the contractor at no additional cost to BESCOM.

4.3.1 The details of clause SW 2.8 and the Cyber Security Guidelines detailed in the **Annexure IX** must scrupulously complied for all the hardware and software supplied in this project

4.4 Following technical areas should be addressed by the Service Provider:

System Security

i. System should be secured through firewall and VPN Connectivity

ii. Transfer of data should be with 256 bit encryption method

iii. Any cryptographic techniques or encryption methods is to be used to safeguard information of data while transferring from client system to Central server or Central server to the Client device.

iv. All transactions should pass through a Workflow defined through Roles and permissions set by the administrator of the system. All workflow approvals should be through Biometric authentication. System should log each transaction with biometric data attached to it. Further this information should be available for auditing

v. The system should be able to track the date and time of each access/read and write events. The time should be synchronized with the real time clock.

vi. System and application use, and attempted use has to be captured to ensure that the integrity and security of the data is maintained.

vii. The system must be capable of capturing log trails, which should contain details about any read/write access to data. Each access must relate to the specific user and details of IP address and Machine ID's with timestamp

- Authentication and Secure Access to solution
- Configurable Function Access Control
- Configurable Data Access Control

viii. Reporting Services

ix. Printing Services

x. Web-based secure access over the internet

xi. Support Workflow for various requests, review and approval required within various business processes

xii. Web based System Administration of entire application

xiii. Audit

4.5 Supply of Stationery & Consumables: The required Hardware and stationery for both spot billing in the spot billing machines as well as for back office purposes to meet the day to day activities at each Sub-Division/ Section Offices shall be supplied by the successful bidder. The collection of revenue will happen at the local Cash counters of the Sub-Division where ATP machines are not available. The operations at the cash counter will be carried out by the staff of BESCOM and actual handling of cash, cheques and drafts etc. will be done by BESCOM officials only. System shall also support Group Billing and Group payments through NEFT and RTGS

- Successful Bidder is responsible for providing sufficient quantity of one side pre-printed Thermal Billing Rolls for Spot Billing, Receipt Rolls for Spot Collection and Office Cash Counters. The pre-printed contents shall be as per the requirement of the BESCOM. Contents may vary from time to time. Billing & Receipt details shall be generated on a Top-quality 70 GSM thermal paper in Kannada & English (both languages) or in Kannada language only as per the requirement of BESCOM. Complete Billing and Receipt information shall be printed as per the current formats. Rear side shall be used for depicting the pre-printed General Instructions and messages to the consumers. BESCOM reserves right to vary the length & contents, the content shall include General Instructions, messages advertisements in the form Text or pictures or both in Text and pictures, either in black and white or in colour and Bidder shall provide according to the need and necessity of BESCOM without any additional cost implication to BESCOM. The size of the bill shall be 10 inches length and 76 to 78 mm width.
- Successful Bidder to provide sufficient quantity of top quality Thermal paper required for generation of bills and drawing Receipts on the spot as per the specification given in **Annexure-II**.
- Successful Bidder is responsible for replacing cartridges, ribbon, toner etc. A stock of 30- days requirement shall be maintained.
- Successful Bidder shall provide DVD etc., back up for maintaining data on monthly basis in addition to keeping the daily back at BESCOM Data Centre.
- Successful Bidder to provide Office Stationery - - Standard A4 & A3 size 75GSM paper
    a. Minimum Single sheet (A4) 2000 sheets for every 10,000 installations per month
    b. Minimum Single sheet (A3) 500 sheets per Sub-Division per month.
- SP to provide Office Stationery - Standard A4 & A3 size fanfold paper and Computer Receipts
- One month paper stock requirements shall be maintained in every Sub-Division for all the above items strictly.

5. Part-4: Providing required Man power support.

The Service Provider should provide the following manpower services:

5.1 Project Manager (PM): The Project Manager (one no.) with BE qualification with more than 5 years experience should be positioned at office of the Corporate Office, BESCOM, Bengaluru & should be available on call. The incumbent shall have a minimum qualification of BE (Computer Science) or (Information Science) / B.Tech (Computer science) / BCA / MCA / BSc with more than five years working experience of on at least for one project as of similar work.

The roles & responsibility of the Project Manager is as follows:

a) He / She should co-ordinate with all the Sub-Divisional / Divisional or higher Officers of BESCOM.

b) Should take responsibility for smooth functioning of web based TRM work as per the scope of the tender including data migration, knowledge transfer etc., in the various offices of BESCOM.

c) Should attend meetings called by BESCOM Officers & resolve the problems as identified by the Officers.

d) Should take necessary measures to train the end user or BESCOM staff to utilize the web based TRM Application Software.

e) Should be capable to solve the software issues & any other issues as & when identified during the work process, periodical maintenance of hardware items & accessories, providing manpower services i.e System Administrator & Data Entry Operators to Sub-Divisions/Acct. Sections.

f) Should be a middle person to interact with Service Provider & BESCOM & he/she shall be available at Corporate Office, BESCOM office during office hours & after office hours shall be available over mobile phone.

g) The weekly progress on the work, problems rectified, action taken & any relevant information essential etc., should be reported to SEE (Projects), BESCOM.

h) Any work assigned by BESCOM which are essential for the web based TRM work.

5.2 One technically qualified personnel (support staff) of Successful Bidder having BE / Diploma qualification with experience in hardware and software in shall be available at each SDO for shall also take care of all hardware and software related problems and also responsible for maintaining the SBD/ other hardware in good working condition including charging, exchange of data between server to SBD and vice versa and also assist/support the BESCOM staff to work on the application. He shall co-ordinate for repair/replacement of all hardware. The qualified personnel (support staff) of Successful Bidder shall be familiar with all the functionality of the application. Exchange of data transfer between servers of SP & Non- RAPDRP servers is the responsibility of support staff

provided by the SP. Maintaining stock of stationery like top coat thermal rolls, DVD, etc, at SDO level is the responsibility of support staff provided by the SP.

5.3 One service Engineer having BE / Diploma qualification with experience in hardware and software well versed with the SBD technology implemented to be stationed at each Division Office with enough spares so that he can act as one point person for the immediate repair of SBD and other hardwares deployed at subdivision office. The EE/AO of the concerned Division will plan out a route map on need basis within his division of this engineer for repair works only.

6. Part-5: Provision for Supply, configure and Installation of RFID/NFC permanent metallic sticker at Meter - Deleted.

7. Part-6: Provision for GIS Survey including supply for satellite imagery and plotting of assets on the map.

7.1 The methodology of Consumer Indexing and Asset Mapping is defined in detail under 3.3.7 and 3.3.8 Survey, Consumer Indexing and Asset Mapping of BESCOM.

7.2 Under this tender, among the methodology defined in 3.3.8 and 3.3.9, the following deviations in the scope of works shall prevail in particular:

1. GIS Asset Mapping survey is GPS based with +/- 2.5 m location accuracy.
2. Necessary data for the consumer indexing in GIS will be provided by the utility under bidder has to integrate the same with the network data.

7.3 Activity wise scope of works is as follows:

a. Base-Map Creation:

i. Procurement of Satellite Imagery of 2.5 m or better resolution, mono data type and creation of Base Map of BESCOM.
ii. Establishment of ground control points using GPS instruments
iii. Geo reference the satellite imagery with ground control points captured
iv. Creation of Base map of all towns under scope.

b. Asset survey and mapping of Electric Network assets:

i. Mapping the location co-ordinates (Latitude-Longitude) of each of the electrical network entities from 66kV/33/11 kV system, RMUs, DTs and poles/feeder pillar boxes (over/under ground) from which each customer is connected and of town's landmarks using "GPS" method while doing field survey. Collecting and developing attribute data of each network entity and mapped landmarks.
ii. The GPS mapping must be done with +/- 2.5 m location accuracy.
iii. The GPS survey instruments proposed by the bidder shall be got approved by BESCOM before starting the survey.

iv. Preparation of digitized electrical network mapped on the base map in the pre- defined scale with features and attributes of assets collected through GPS survey for GIS application.
v. After completion of survey, digitized HT and LT network maps to be submitted to utility for validation and sign off as follows:
   a. Soft copy in colour of Feeder wise HT Network asset maps overlaid on land base.
   b. Soft copy of DT wise LT Network asset maps overlaid on land base.
vi. The data digitization by the bidder shall be as per the data model specified by the proposed SI.
vii. After sign off, the final configured GIS data to be submitted to utility to migrate the same into production by the proposed SI.

c. Asset-ID Painting:

a. Asset-ID painting to be carried out on the following assets:
   i. HT and LT Support Structures
   ii. Distribution Transformer Centre
   iii. Distribution Transformer Structure
   iv. Ring Main Unit
   v. Load Break Switch
   vi. HT & LT Feeder Pillar Box

b. As per the current data model, Asset-ID comprises of 11 digits with painting carried out with white colour foreground numbers on Black colour background.
c. Asset IDs are painted either vertically or horizontally depending on asset orientation in field.
d. Asset-ID painting for town to be carried out after generation of Asset IDs in GIS production database.

d. Consumer indexing data integration

i. Spatial tagging of Consumers to source asset code (HT pole/RMU in case of HT consumers and LT pole/DT/LT FPB in case of LT consumers) connected with each 11 kV Feeder in GIS system to enable calculation of Town wise, Feeder wise, DT wise Energy Audit.
ii. The consumer Indexing data will be provided by the utility with necessary details such as Consumer Account ID, MUSS name, Feeder Name, Feeder Number, source asset code etc., in coordination with proposed SI.

7.4 After completion of Asset survey, bidder has to publish the cut-off date for each town when the data is submitted to Utility for validation and Sign off.

7.5 The incremental changes (addition/deletion/modification) in the GIS database are due to the regular day to day changes in the Electrical network and consumers in field after the date of completion of survey by the bidder and submission of surveyed data to utility for validation. Post

the cut-off date specified for each town, whatever changes happen on the feeder will fall under incremental update.

7.6 Utility will provide the incremental changes in Assets and Consumer data/ information as per template. The bidder shall capture the latitude and longitude values along with attributes for these incremental changes in Network assets, collected through GPS instrument.

7.7 Bidder shall carryout Asset painting for Incremental Assets also.

7.8 The activities defined under 7.4 to 7.7 shall be continued throughout the contract period.

7.9 Once declared live, the update will automatically be done through IT enabled Business Process by Utility.

BESCOM may utilize this service from the Service Provider or it may perform the GIS survey activity on its own based on the future requirement/necessity of BESCOM. The service provider is entitled to get the payment for the GIS field survey activity as per the quoted/awarded price only if the services are availed by BESCOM.

8.0 Part-7: Provision of manpower for Meter Reading and Issue of Bills at the Spot and other activities as desired by BESCOM:

8.1 The successful bidder shall provide the Meter Reader for the purpose of meter reading and issue of electricity bill to the consumer at the spot based on the need and requirement of the BESCOM. The Meter Reader must have minimum qualification of ITI / JOC / PUC. The brief roles and responsibility of the Meter Reader to be provided are as follows,

a) Supplying man power for Reading of all the installations in the jurisdiction and shall issue spot bills from 1st to 15th of every calendar month or mutually agreed schedule irrespective of the Seasons without fail.
b) Meter readers shall read the energy meter in the consumer premises. Modes of capturing the reading shall be as per the BESCOM requirement.
c) The meter reader shall issue the electricity bills on the Spot using the spot billing devices.
d) Defects/ Observations in existing installations if any shall be brought to the notice of Section Officers / Sub-Division Officers/ by recording in the meter reader's observation book or SBD.
e) Spot Serial DTC wise Inventory of installations shall be done & updated as per the instruction of the Section Officers / Sub-Division Officers.
f) In case of dispute in the reading the same shall be brought to the notice of concerned jurisdictional Engineer for further course of action.

g) BESCOM will show locations of the meters and furnish Meter Reading Sheet to the successful bidders personnel one time for which the successful bidders shall do the meter reading activity. BESCOM ensures the RR numbers or account ID is written at the meter box as per the standard rules and regulations.

h) The meter reader personnel provided by the successful Bidder shall assist BESCOM for the disconnection activity and any other activity / surveys after the completion of Meter Reading as desired by BESCOM.

i) It is responsibility of the successful bidder to carry out 100 % accurate billing at the assigned area. However BESCOM will provide necessary support.

j) Approximate number of meter reader needs to be deployed is Nine Hundred and Ninety Four

8.2 BESCOM will issue separate orders for deployment of meter reading personnel as per the need and requirement and successful bidder shall arrange the required manpower for the Meter reading purpose within the mutual convenient time. The allocation of the installation to the successful bidder shall be area wise or DTC wise or feeder wise or O&M Unit wise.

8.3 The successful bidder shall be paid per billed installation per month basis for the work of meter reading as quoted/ awarded.

8.4 Attendance of the Support personnel shall be maintained in each of the SDOs and shall be produced along with invoices.

9.0 Data Centre (DC) & Disaster Recovery Centre (DRC):

i. The Service Provider to establish Central Server at a secured tier 3 Data Centre at India & DRC in Virtual Private Cloud maintained by reputed Company in the client's name of BESCOM at different seismic Zone with High Availability auto switch over in case of break downs. The Disaster Recovery Centre should be hosted in cloud Technology in the client's name of BESCOM. All the necessary charges for hosting the DC & DRC should be borne by the service provider and handover the database server to BESCOM at the end of the expiry of the contract period without any additional Cost. Access to DC and DRC shall be provided to BESCOM designated personnel

ii. The Service Provider should provide appropriate Data Centre infrastructure or Cloud facility to host the application.

iii. The Service Provider should have the following with regard to Data Backup / replication facility at Data Centre where TRM application is hosted

- ✓ The Data Centre (DC) will have robust Data Backup & Restoration Management facilities.

- ✓ It will facilitate comprehensive online real-time Backup of TRM application, database & all the data related to TRM.
- ✓ It will have capability for remote or offsite replication of TRM application including comprehensive backup & restoration.
- ✓ It should be of the latest generation & have a clear roadmap in terms of future scalability & upgrades.
- ✓ The Service Provider should clearly specify & furnish the functional diagram, technical details of servers, software's, licenses(if any), hardware items, accessories, gateway devices, security devices, backup devices etc., & complete requirements for smooth working of web based TRM services in BESCOM utilizing DC & DRC and handover these to BESCOM or BESCOM appointed new agency without any additional cost to BESCOM.

iv. The Data Centre (DC) will have robust Data Backup & Restoration Management facilities. It will facilitate comprehensive online real-time Backup of TRM application / Modules, database & all the data related to TRM in the BESCOM DATA Centre.

10. Server maintenance:

- ➢ Ensure Uptime of the server 24/7.
- ➢ Periodical maintenance of the server.
- ➢ Up-gradation of Server Hardware resources as and when required.
- ➢ Repair & replacement of components.
- ➢ Requisite tools shall be deployed to automatically compute server availability.

11. Warranty:

It is the responsibility of the Bidder to maintain all the hardware and software in good, healthy, updated conditions all the times and to take immediate action for the replacement of any failed hardware items such as SBDs, DC – DRC, Desktop PCs, Laser Printers, UPS etc., so that the services should not be hampered. If the warranty period of the any of the Hardware items such as SBDs, Desk top Computers etc., is more than the Contract Period, same extended guarantee / warrantee shall be passed on to BESCOM. If the warranty period of the any of the Hardware items such as Network Printers, UPS etc., is less than the contract Period, then these items shall be replaced by brand new items if any of the items failed during the contract period. Software should have a lifetime warranty period.

12. **Licenses:** All the licenses required for the project are to be secured in the name of BESCOM.

13. Any material /equipment / Components / software not specifically

stated in the Specifications and Documents and which are necessary for trouble free successful Operations of TRM system specified in these Specifications, shall be deemed to be included unless specifically excluded. All such material /equipment / Components / software shall be provided without any extra Cost.

14. **Brand Names or Equivalent:**

Wherever an equipment / material / component or article is specified or defined by the name of a particular brand, Manufacturer or Vendor, the specific name mentioned shall be understood as establishing type, function and quality and not as limiting competition.

SECTION 'C'- GENERAL TERMS AND CONDITIONS

1. TERMS OF PAYMENT:

1.1 The liability for payment to the Firm against the service for all Active Metered Installations eligible for spot Billing will start only in the subsequent month of the successful generation and delivery of error free bills in respect of all kinds of consumers (all tariffs) and generation of all the required periodical MIS and Spot Billing Device reports and submission of all deliverables at Sub- Division level up to the Corporate Office level. Payment shall be made at respective Division Offices of BESCOM on monthly basis on submission of Invoice in duplicate along with attendance of the support personnel and the complaint log details certified by the Sr. Asst./ Asst. Accounts Officer and Assistant Executive Engineer (Elec.) of the respective Sub-Division and counter signed by the respective Executive Engineer (Elec.), O&M Divisions. The payment of first bill is subject to complying with the hardware and connectivity requirement by the Service provider. The Payment shall be subjected to pre-audit.

1.2 When BESCOM utilizes the services of meter readers, the payment to the Firm towards work of Meter Reading and issue of bill to the consumer at the spot shall be made on monthly basis for the number of bills issued to the consumer by the Firm's personal/MR. The Firm shall submit the separate invoice in duplicate within 5th of every month to the respective Sub-Division Office pertaining to the bills issued to the consumer at the spot in the previous month. Payment shall be released to the Firm after the certificate from Concerned Sub-Division Officer and Division officer. The Payment shall be subjected to pre-audit.

1.3 When BESCOM utilizes the services of the Firm for the implementation of GIS field survey as per the scope of work Clause-7 (Part-6) one-time payment shall be made after the completion of the activities. The Firm shall submit the invoices as per the awarded rate in duplicate to the respective Sub-Division Office pertaining to the work carried out in the previous month. Total Payment shall be released to the Firm after the certificate from Concerned Section officer, Sub-Divisional Assistant Executive Engineer (Elec.) and counter signed by the respective Divisional Executive Engineer (Elec.). Required details for the same shall be furnished in the Invoice. The Payment shall be subjected to pre-audit.

2. Service Level Agreements (SLA):

Penalty shall be levied for deficiency of service and non-deliverables by service provider are as follows:

2.1 Before Go Live/Roll Out:

If the Service Provider defaults in complying all the assigned requirements as per tender condition penalty at the rate of 1/2% (Half percentage) per week, subject to a maximum of 10% reckoned on the contract value will levied till the same is complied. This shall be estimated by General Manager, Customer Relations based on the delay in roll out by Vendor excluding the delays on behalf of BESCOM like providing necessary input/data, approvals etc.

2.2 After Go Live:

After go Live, if any/all of the following are not compiled, penalty at the rate of 1/2% (Half percentage) per week maximum of 2% (Two percentage) per month will be levied on respective monthly invoice amount of Sub-Division/Accounting unit.

2.2.1 Non–providing of prescribed software / software service / bandwidth / response time as per the scope, generation of bills, MIS reports, DCB, cash receipts, etc.
2.2.2 Not providing replacements of server hardware, Desktop PC's, UPS, Printers, SBD's, etc., in case of breakdowns and non-keeping of standby units as per specifications.
2.2.3 Not providing required manpower for system support as per the scope of work.
2.2.4 Not providing required stationery.
2.2.5 Not providing Man Power for Meter Reading activity
2.2.6 Non-generation of bills due to the deficiency of service by the service provider (Including SBDs, stationery, Connectivity, software etc)

2.3 Misappropriation: BESCOM reserves the right to recover the loss sustained along with 10 % penalty in case of misappropriation by the service provider or his staff with or without colliding with BESCOM staff or due to security lapses or any lacunae in the system. This is without prejudice to the recourses BESCOM may take for such misappropriation/losses.

Sub-Divisional Officer will maintain a Complaint register containing all the relevant details such as Type of compliant, Date of Compliant lodged, Docket No., Date of Rectification, etc. and a register showing No. of bills generated, not generated/generated with delay due to SBD problem with attestation by Sr. Asst. /AAO and Representative of Service Provider (personnel working in SDO). Penalty shall be calculated based on the delay in providing the rectification as per the above mentioned register.

3 FORCE MAJEURE:

a) For the purpose of this contract 'Force Majeure' means, an event which could not reasonably, have been avoided by a diligent party in the circumstances, which is beyond the reasonable control of a party and which makes a party's performance of its responsibilities hereunder impossible or so impractical as reasonably to be considered impossible in the circumstances and includes, but is not limited to war risks, civil disorder, earthquake, strikes, lockouts or other industrial action, electrical failure confiscation or any other action by Government Agencies.

b) Force Majeure shall not include any event, which is caused by the negligence or intentional action of a party or such party's sub-contractors or agents or employees or by a failure to observe good Engineering practices.

c) Force Majeure shall not include insufficiency of funds or failure to make any payment required hereunder.

4 TRAINING: Service Provider to impart effective training to BESCOM personnel as below:

a) BESCOM end users to work on the application. The application may get regularly modified and enhanced with new features. This calls for the end users to be educated on new changes of the software.

b) Training shall be imparted to all the end Users at each Division / Sub-Division.

c) The other activities related to training will be:
   - Providing user manuals for training initially and updated user manual once in 3-
     Months
   - Maintaining a help desk for resolving the queries from the end users
   - Maintaining a test environment for practice

d) Addition Training Requirements: Refresher Training Course/Training program should be repeated after 6 months of implementation or as when requested by BESCOM for specified number of users.

5 DELIVERABLES:

a) Successful bidder shall be given one pilot Sub-Division in each circle, where he shall perform the scope of work successfully

b) Satisfactory Performance of the obligations of the Contract

c) Data Base: At the end of every month, the SP shall hand over soft copy of updated Database to BESCOM Corporate Office.

d) User manual: SP to provide updated user manual on every new version of release.

e) Documents: SP to provide hard and soft copy of the document relates to any modification, database migration, Data backup and enhancement of application software, release of new versions.

6 DOCUMENTATION:

Withstanding any other issues, to be classified under specified categories.

- Necessary document to be maintained.
- If any modifications are to be made to the existing application the same shall be incorporated on written consent from the BESCOM, Corporate Office.

7 Complaint handling & Help Desk:

- The Service Provider shall provide BESCOM end users a Ticketing Tool as a single point of contact (Help Desk) and the escalation matrix to escalate the issues according to their priorities. The escalation list should contain the phone numbers and the e-mail id's to which the issues are to be escalated.
- A log extract of queries originating from various end-users and the solution given by the Firm shall be given every month along with the monthly Invoice along with view access to all the hierarchies.
- The service provider shall provide one service centre in each Division for maintenance of SBDs and other Hardware in good working condition for running day to day activities smoothly.
- Based on the severity and timelines of the problem the Firm shall deploy additional resources to resolve the issue within the time line.
- All issues/bugs reported by BESCOM users would be centrally managed / tracked by the Firm. No claims or whatsoever will be entertained for any such additional resources.

8 GENERAL:

a) The service provider should work in co-ordination with other hardware/ network maintenance agencies for smooth functioning of day to day activities.
b) Assist to conduct evaluation tests to evaluate the Sub-Divisional personnel on usage of Billing software and Cash Counter Software.
c) Team/personnel identified by BESCOM shall be involved and trained in all the activities.
d) Designated person/ team to maintain monitor and administer the application software and database

9 KNOWLEDGE TRANSFER:

The SP should ensure that complete consumer data and commercial data is smoothly transferred to the new Service Provider / BESCOMs staff at the end of the contract period or as and when the same is required by BESCOM without hiding any parameters. Necessary Technical support / training on maintenance should be ensured by SP in such an event for smooth functioning of the application software at the new Service Provider / BESCOM without any additional cost to BESCOM up to the satisfaction of BESCOM.

At the end of the Contract period, the SP shall ensure the following without any additional cost to BESCOM.

i. The SP shall provide Knowledge transfer project plan scheduled for a minimum period of one or more months.
ii. The IT team of SP should be in a position to showcase the build and deploying part of the source code.
iii. All the issues that were internally addressed by the SP should be handed over to new Service Provider / BESCOMs staff.
iv. The SP should provide work instructions for setting master data.
v. The SP should provide server detail document (DC and DRC)
vi. The SP should provide Network Diagram.
vii. The SP should provide all licenses.
viii. The Rigorous Knowledge transfer sessions are to be conducted for a minimum period one or more months, until the complete knowledge is transferred to the new Service Provider / BESCOMs staff which includes hand over of architecture, all licenses, flow charts, latest version of source code which is deployed in the production, security mechanism, process flow, operational hierarchy, various functionalities, logics etc.,
ix. Rigorous hands on training sessions are to be conducted for a minimum period one or more months, until the complete hands on training is provided to the new Service Provider / BESCOMs staff which includes operation and maintenance of the complete system.
x. Even after giving rigorous knowledge transfer session / training, the SP shall render assistance to the new Service Provider / BESCOMs staff as and when required by BESCOM for a period one year from the date of handing over.

10 PERFORMANCE GUARANTEE :

10.1 As a Contract Performance Security, the successful Bidder, to whom the LOI is placed, shall be required to furnish a Performance Guarantee equal to **Five percent (5%)** of the Contract value in the form of Bank Guarantee from any nationalized/scheduled Bank and it shall guarantee the faithful performance of the Contract in accordance with the terms and conditions specified in these documents and specifications. The PBG shall be valid up to **180 days** after the expiry of Contract Period. If Service Provider fails to furnish the PBG within stipulated period, BESCOM reserve right to terminate the contract and forfeit the EMD.

10.2 Performance Guarantee will not carry any interest.

10.3 The above Performance Guarantee is to be submitted within twenty

(20) days from the date of issue of the Letter of Intent (LOI) and shall remain valid up to One Hundred and Eighty **(180)** days after the expiry of contract period.

10.4 In case the contract is renewed, the successful bidder has to extend the validity of the Performance Bank Guarantee for a further period of One Hundred and Eighty **(180)** days after the end of the renewed contract Period.

10.5 The proceeds of the Performance Guarantee shall be payable to BESCOM as compensation for any loss resulting from the failure on the successful bidder's part to complete its obligations under the Contracts or if any Liquidated Damage is levied on the agency as per terms of the Contracts.

11 TERMINATION FOR DEFAULT:

a) BESCOM may without prejudice to any other remedy for breach of Contract by 30 days written notice of default sent to the Service Provider , terminate the Contract in whole or in part, If the supplier fails to carry out the work satisfactorily in the contract period or in case the Materials/ equipment/ software supplied are found not in accordance with prescribed specifications and/or approved sample or if found to have furnished misleading or false representations in statements and attachments submitted as proof of the qualifying requirement at a later date or If the Supplier fails to perform any other obligation(s) under the Contract the Company shall exercise its discretionary powers on any or all the following:

- To recover from the successful bidder, as agreed, liquidated damages or by way of penalty, the amount as per penalty clause above; and

- To avail the services elsewhere, after giving due notice to the successful bidder on account and at the risk of the successful bidder such materials/services not so delivered or others of a similar description without cancelling the contract. In respect of the consignment not yet due for delivery, the successful bidder shall not be entitled to any saving on such purchase made against default.

    - ✓ To cancel the Work award.
    - ✓ To forfeit the performance guarantee.

b) Whatever may be the conditions of sale specified or indicated in the quotations, itis only the conditions indicated in the Contract Order and Scope of the work / technical specifications which will be binding upon BESCOM. On receipt of the Contract Order if any successful bidder

finds his inability to accept any of the terms/conditions, he shall raise the issue specifically and immediately get the matter clarified. The decision of the company shall be final as regards the acceptability or otherwise of materials/ equipment/ Services supplied.

12 Sub-Contracts:

Subletting a part or a portion or the entire contract are not allowed, the bidder has to provide all services.

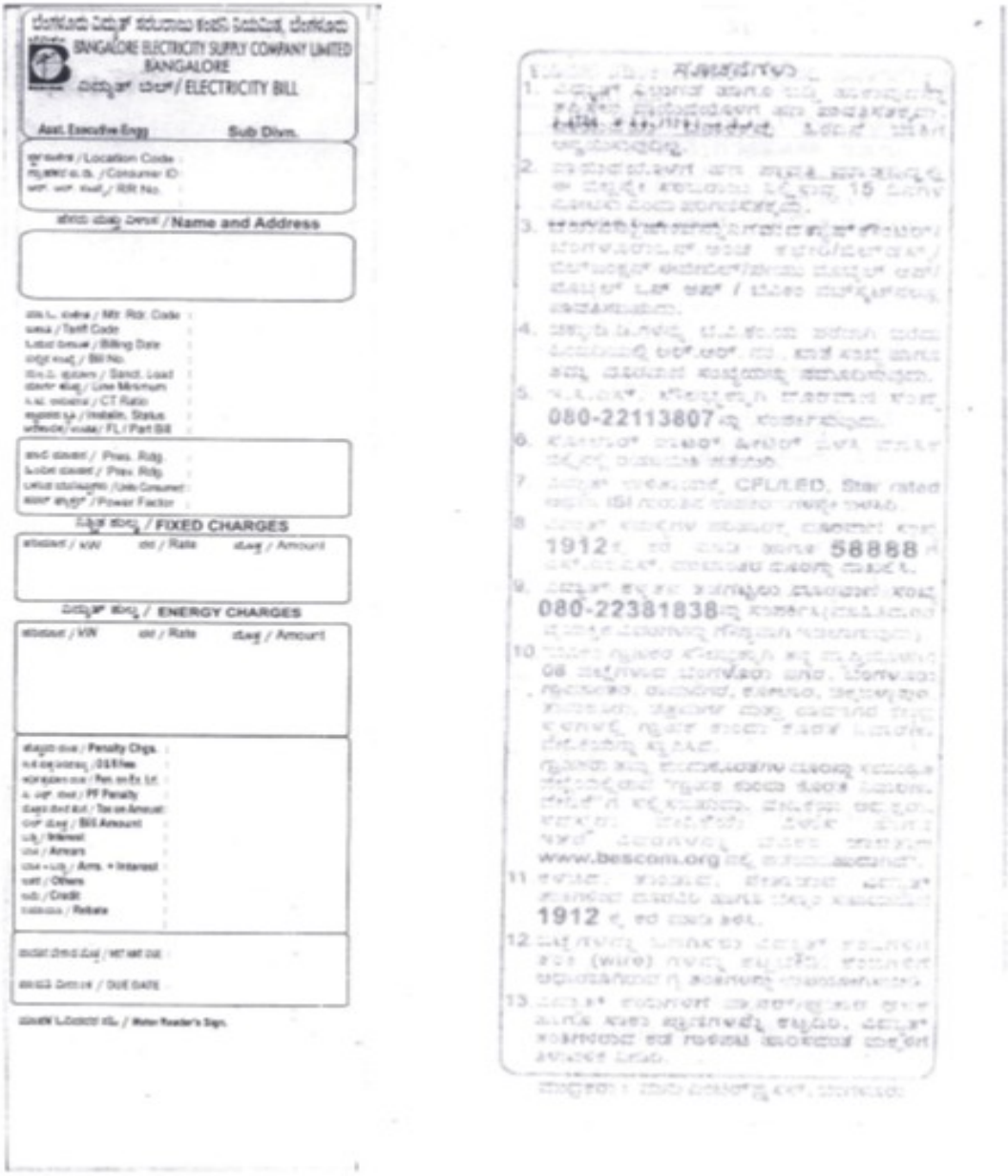
SECTION D "ANNEXURES"

ANNEXURE-I

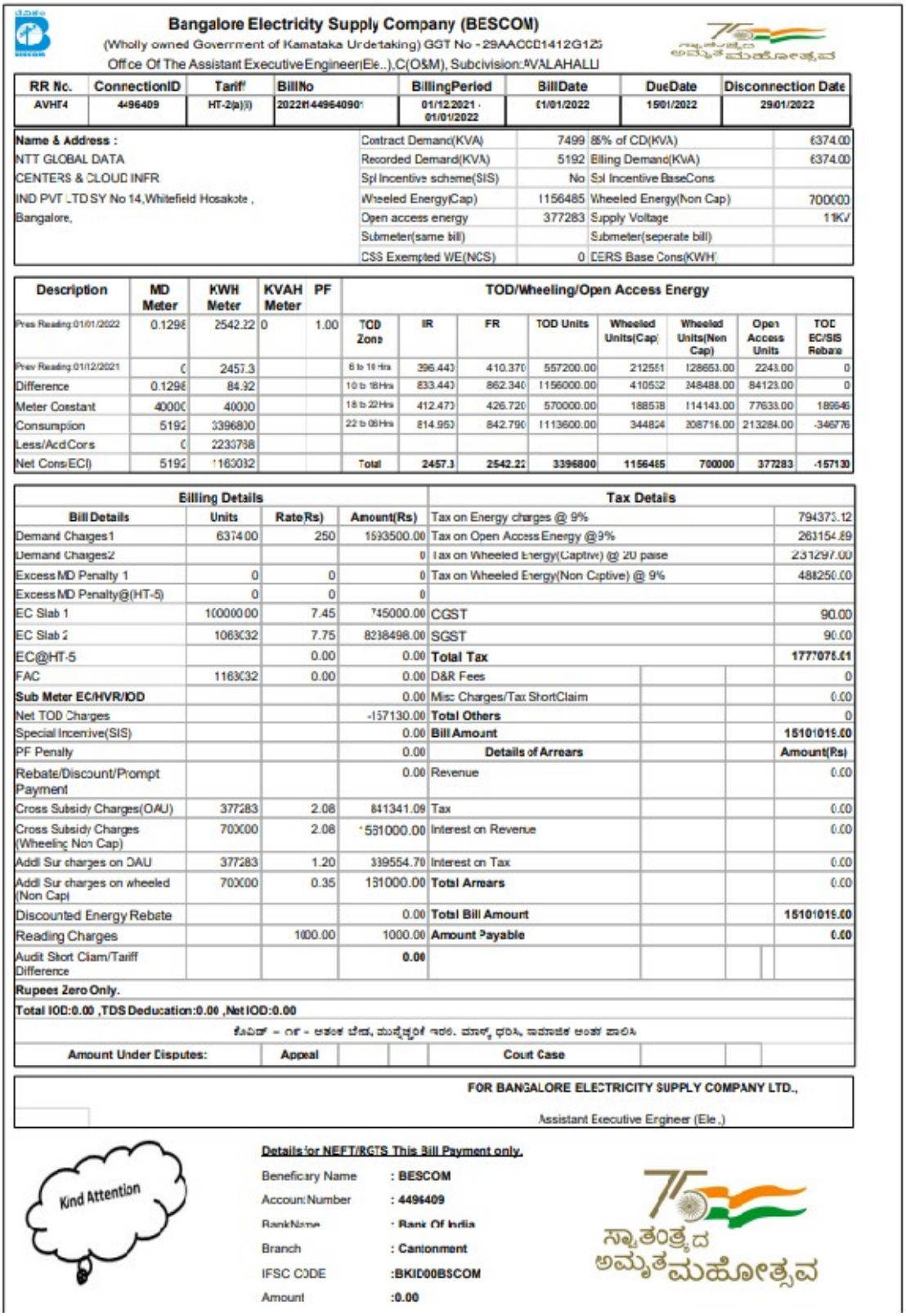
Spot bill format

Spot bill format should be 1 0 " length and 3" width appropriate coving all the information legibly with good quality thermal paper.

A. LT Bill



B. HT Bill



Bangalore Electricity Supply Company (BESCOM)

(Wholly owned Government of Karnataka Undertaking) GST No - 29AACCB1412G1Z5

Office Of The Assistant Executive Engineer(Ele..),C(O&M), Subdivision:AVALAHALLI

RR No.	ConnectionID	Tariff	BillNo	BillingPeriod	BillDate	DueDate	Disconnection Date
AVHT4	4496409	HT-2(a)(i)	2022fi144964090'	01/12/2021 - 01/01/2022	01/01/2022	15/01/2022	29/01/2022

Name & Address :					
NTT GLOBAL DATA	Contract Demand(KVA)	7499	85% of CD(KVA)		6374.00
CENTERS & CLOUD INFR	Recorded Demand(KVA)	5192	Billing Demand(KVA)		6374.00
IND PVT LTD SY No 14,Whitefield Hosakote ,	Spl Incentive scheme(SIS)	No	Spl Incentive BaseCons		
Bangalore,	Wheeled Energy(Cap)	1156485	Wheeled Energy(Non Cap)		700000
	Open access energy	377283	Supply Voltage		11KV
	Submeter(same bill)		Submeter(seperate bill)		
	CSS Exempted WE(NCS)	0	DERS Base Cons(KWH)		

Description	MD Meter	KWH Meter	KVAH Meter	PF	TOD/Wheeling/Open Access Energy							
Pres Reading:01/01/2022	0.1298	2542.22	0	1.00	TOD Zone	IR	FR	TOD Units	Wheeled Units(Cap)	Wheeled Units(Non Cap)	Open Access Units	TOD EC/SIS Rebate
Prev Reading:01/12/2021	0	2457.3			6 to 10 Hrs	396.440	410.370	557200.00	212551	128653.00	2243.00	0
Difference	0.1298	84.92			10 to 18 Hrs	833.440	862.340	1156000.00	410532	248488.00	84123.00	0
Meter Constant	40000	40000			18 to 22 Hrs	412.470	426.720	570000.00	188538	114143.00	77633.00	189646
Consumption	5192	3396800			22 to 06 Hrs	814.950	842.790	1113600.00	344824	208716.00	213284.00	-346776
Less/Add Cons	0	2233768										
Net Cons(ECI)	5192	1163032			Total	2457.3	2542.22	3396800	1156485	700000	377283	-157130

Billing Details				Tax Details				
Bill Details	Units	Rate(Rs)	Amount(Rs)	Tax on Energy charges @ 9%				794373.12
Demand Charges1	637400	250	1593500.00	Tax on Open Access Energy @9%				263154.89
Demand Charges2			0	Tax on Wheeled Energy(Captive) @ 20 paise				231297.00
Excess MD Penalty 1	0	0	0	Tax on Wheeled Energy(Non Captive) @ 9%				488250.00
Excess MD Penalty@(HT-5)	0	0	0					
EC Slab 1	1000000	7.45	745000.00	CGST				90.00
EC Slab 2	1063032	7.75	8238498.00	SGST				90.00
EC@HT-5		0.00	0.00	**Total Tax**				**1777075.01**
FAC	1163032	0.00	0.00	D&R Fees				0
Sub Meter EC/HVR/IOD			0.00	Misc Charges/Tax ShortClaim				0.00
Net TOD Charges			-157130.00	**Total Others**				0
Special Incentive(SIS)			0.00	**Bill Amount**				**15101019.00**
PF Penalty			0.00	**Details of Arrears**				**Amount(Rs)**
Rebate/Discount/Prompt Payment			0.00	Revenue				0.00
Cross Subsidy Charges(OAU)	377283	2.08	841341.09	Tax				0.00
Cross Subsidy Charges (Wheeling Non Cap)	700000	2.08	1561000.00	Interest on Revenue				0.00
Addl Sur charges on OAU	377283	1.20	339554.70	Interest on Tax				0.00
Addl Sur charges on wheeled (Non Cap)	700000	0.35	131000.00	**Total Arrears**				0.00
Discounted Energy Rebate			0.00	**Total Bill Amount**				**15101019.00**
Reading Charges		1000.00	1000.00	**Amount Payable**				**0.00**
Audit Short Claim/Tariff Difference			**0.00**					

Rupees Zero Only.

Total IOD:0.00 ,TDS Deducation:0.00 ,Net IOD:0.00

ಕೊಡಿಕೆ – ರಗ – ಅಡಚಣೆ ಬೇಡ, ಮುನ್ನೆಚ್ಚರಿಕೆ ಇರಲಿ. ಮಾಳ್ಳೆ ಧರಿಸಿ, ಇಡಬಾಧೆಕ ಅಂತರ ಪಾಲಿಸಿ

Amount Under Disputes:	Appeal			Court Case			

FOR BANGALORE ELECTRICITY SUPPLY COMPANY LTD.,

Assistant Executive Engineer (Ele.)

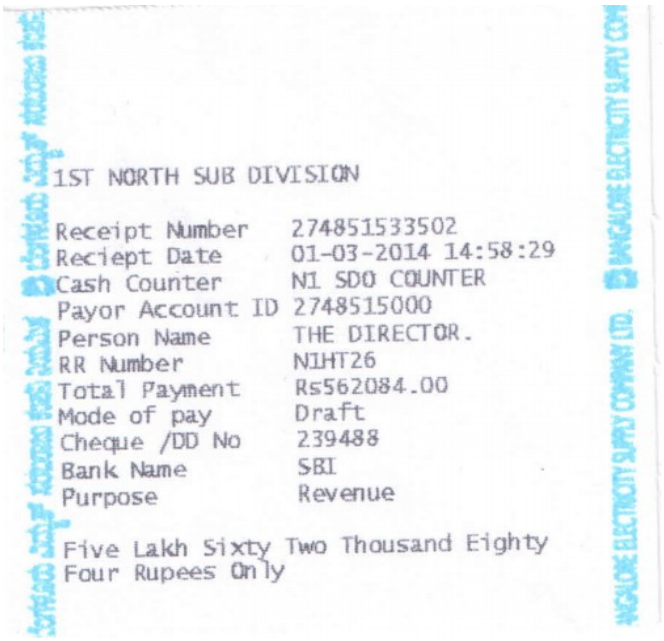
Kind Attention

Details for NEFT/RGTS This Bill Payment only.

Beneficary Name	: BESCOM
Account Number	: 4496409
BankName	: Bank Of India
Branch	: Cantonment
IFSC CODE	:BKID00BSCOM
Amount	:0.00

ಸ್ವಾತಂತ್ರ್ಯದ ಅಮೃತಮಹೋತ್ಸವ

C. Payment Receipt Format:



1ST NORTH SUB DIVISION

Receipt Number	274851533502
Reciept Date	01-03-2014 14:58:29
Cash Counter	N1 SDO COUNTER
Payor Account ID	2748515000
Person Name	THE DIRECTOR.
RR Number	N1HT26
Total Payment	Rs562084.00
Mode of pay	Draft
Cheque /DD No	239488
Bank Name	SBI
Purpose	Revenue

Five Lakh Sixty Two Thousand Eighty Four Rupees Only

ANNEXURE-II

Specification of Hardware: The below mentioned hardware specification is minimum.

A) DESKTOP PCs:

Sl. No.	Parameter	Specification as under or higher
I	**Mother Board**	
1	Chipset Series	Intel H Series
2	Chipset Number	Intel H 410
3	Expansion Slots (PCIe x 1) (Number)	0
4	Expansion Slots (PCIe x 4) (Number)	0
5	Expansion Slots (PCIe x 16) (Number)	1
6	Expansion Slots (PCI) (Number)	0
7	Expansion Slots (M Dot 2)	1
II	**Processor**	
1	Processor Make	Intel
2	Processor Generation	10
3	Number of Cores per Processor	6
4	Processor Base Frequency (GHz)	2.9
5	Processor Description	Intel Core i5
6	Processor Number	Intel Core i5 10400
7	Out of Band Management	NA
8	Cache (MB)	12
III	**Graphics**	
1	Graphics Type	Integrated
2	Graphic Card Description	NA
3	Size of Memory in Case of Dedicated Graphic Card (GB)	0
4	Size of VRAM in case of Integrated Graphics (MB)	0

IV	**Operating System**	
1	Operating System (Factory Pre-Loaded)	Windows 10 Professional
2	Recovery Image Media	NA
3	OS Certification	Windows
V	**Memory**	
1	Type of RAM	DDR4
2	RAM Size (GB)	8
3	RAM Speed (MHz)	2666
4	Total Numbers of DIMM Slots Available	2
5	Number of DIMM Slots populated	1
6	RAM Expandability up to(using spare DIMM Slots in GB)	32
VI	**Storage**	
1	Total Number of Internal Bays available	3
2	Number of 2 point 5 inches internal Bays	1
3	Number of 3 point 5 inches Internal Bays	2
4	Number of 2 point 5 Inches Internal Bays Populated	0
5	Number of 3 point 5 Inches Internal Bays Populated	1
6	Type of Drives used to populate the Internal Bays	HDD
7	Number of Internal Bays populated with HDD	1
8	Capacity of each HDD (GB)	1000 @7200 rpm
9	Total HDD Capacity (GB)	1000
10	Number of Internal Bays populated with SSD	0
11	Capacity of each SSD (GB)	0
12	Total SSD Capacity (GB)	0

13	Number of Internal Bays populated with SSHD	0
14	Capacity of each SSHD (GB)	NA
15	Total SSHD Capacity in addition to 8 GB Flash (GB)	0
16	Number of Internal Bays populated with SSED	0
17	Capacity of each SSED (GB)	0
18	Total SSED Capacity (GB)	0
19	Optane Memory (GB)	0
VII	**Cabinet**	
1	Cabinet Form Factor	Tower (13.1 to 26 Liters)
2	Cabinet Volume (Litres)	26
3	External Bays (Number)	1
4	Optical Drive	N/A
5	Internal Speaker	No
6	Audio-in	Yes
7	Audio-out	Yes
8	Headphone out	Yes
9	Microphone-in	Yes
VIII	**Connectivity**	
1	Wireless Connectivity	Yes
2	If Yes, Type of Wireless Connectivity	Wi-Fi 802.11ac
3	Number of Ethernet Ports	1
4	Type of Ethernet Ports	10/100/1000 on board Integrated Gigabit Port
5	Bluetooth Connectivity	Yes
6	If Yes, Version of Bluetooth Available	4.2
IX	**Ports**	
1	Number of USB Version 2 Point 0 Ports	4

2	Number of USB Version 3 point 0 / 3	4
3	point 1, Gen 1 Ports	
4	Number of USB Version 3 point 1, Gen 2 Ports	0
5	Number of USB Type C Ports	0
6	Number of Serial Ports	1
7	Number of Parallel Ports	0
8	Number of VGA Ports	1
9	Number of HDMI Ports	1
10	Number of DP Ports	0
X	**Monitor**	
1	Model of the Monitor	NA
2	Monitor Technology	TN
3	LED Backlit Monitor Size (INCHES)	21.5
4	Monitor Resolution (PIXELS)	1920x1080
5	TCO Certification for Monitor	NA
6	Number of VGA Ports in the Monitor	1
7	Number of HDMI Ports in the Monitor	1
8	Number of Display Ports in the Monitor	0
9	Availability of Webcam integrated with monitor	No
11	If Yes, Resolution of Webcam	NA
12	Availability of Speakers integrated with Monitor	Yes
13	If Yes, Number of Speakers available	2
XI	**Power**	
1	Power Supply Capacity (Watt)	250
2	Minimum Power Efficiency Range (%)	85 - 89
XII	**Certification**	

1	ROHS Compliance	Yes
2	BEE / Energy Star for the given Model	Yes
XIII	**Input Devices**	
1	Mouse Connectivity	Wired
2	Type of Mouse	Optical Scroll
3	Keyboard Connectivity	Wired
4	Type of Keyboard	Standard with Rupee Symbol
XIV	**Operating Conditions**	
1	Minimum Operating Temperature	10 degree Celsius
2	Maximum Operating Temperature	40 degree Celsius
3	Minimum Operating Humidity (%RH)	10
4	Maximum Operating Humidity (%RH)	90
XV	**Warranty**	
1	On Site OEM Warranty (Year)	3

B) Technical Specifications of Android OS Based integrated Spot Billing Devices (SBD)

Sl. No.	Parameter	Specifications as under or Higher
1	Display	Form factor-Bar, Screen type-Touch screen, Screen size-min of 4 inches, resolution-min of 480X 584, No. of colours-min of 16M
2	Processor	Quad core, cumulative speed at min of 4 GHz or above
3	Memory	RAM min 3 GB. Internal memory of min 8 GB with extendable up to min of 32 GB
4	Camera Features	At least 8.0MP Rear camera with Auto focus; with LED light. 2.0 MP front camera:

5	General Features	Android OS 12 or higher version (all up to date security patches) with Bluetooth 4.0 or higher features, messaging, GPS, USB connector, OCR, NFC permanent metallic sticker etc.
6	Data	3G/4G or higher, Wifi 802.11 b/g/n
7	Sound	Media player for audio and video
8	Battery	Type- Li-lon/ Li-Polymer, Capacity- Min of 6000mAH, supports dismounting, stand by time 72 hours, operating time 12 hours, generation of Min 500 bills (each bill of 10 inch length) per charge
9	Miscellaneous features	All other features to be disabled and only the required app to be enabled.
10	Fingerprint sensor/ Biometric	Sensor-FRC 101 IFI, processor FPC 202 OQ(64 pin QFN9*9mm)
11	GPS	Built-in GPS, support A-GPS
12	IOT Functions	**1D Barcode:** Code 128, EAN-13, EAN-8, Code39,UPC-A,UPC-E, Codabar ISBN/ISSN, Code93,UCC/EAN-128, GS1 Databar, HIBC or latest
		2D Bar code: Built -In QR, PDF417 Code 128, EAN-13, EAN-8, Code39, UPC-A, UPC-E, Code bar, Interleaved 2 of 5, ISBN/ ISSN, Code93, UCC/EAN-128 or latest
		RFID/NFC Permanent metallic Sticker:
		Fully support NFC, 13.56MHz (ISO14443A/B,15693 Protocol), Reading distance 2~ 5cm. Support UHF RFID (EPC C1/G2, 18000- 6 protocol), reading and writing tags (optional) 2.4GHz active RFID module, reading distance can reach 30~ 50m (optional)
13	Printer	3 inch integrated thermal printer with minimum 10 meter paper roll load capacity. Velocity: 15mm/s

14	Software	SBD should have a customizable utility billing software
The device should be a single piece system, with the printer integrated at the PCB/board level **The SBD should also support following features / functionality:** Real Time (on-line) spot billing as per KERC tariff order and relevant data exchange. Real Time spot collection by cash /DD /cheque / UPI Payment modes and relevant exchange. Auto meter reading download from optical port / Bluetooth device / RF&IR **/ OCR**. Display and generation of disconnection list, capturing disconnection details and auto upload. Display and generation reconnection list, Capturing reconnection details & auto upload. Reports (Summary / detail) SBD software should be customizable for the utility billing application (including Spot collection, disconnection and reconnection) Capturing DTR reading and DTR wise Energy Auditing.		

Note: Above specification mentioned are minimum requirement, however better/higher specs are accepted.

C) RFID/NFC permanent metallic sticker Specification:

- Memory : Minimum 48 Bytes.
- Universal Compatibility : Works with all NFC Smart phone or SBD in the world.
- Size : Approximate 30 mm, Antenna size : 25 mm.
- Material : Adhesive Metallic sticker, water resistant coating.

D) Net Work Laser Printer (B/W) :

Sl. No.	Parameter	Specification as under or higher
1	Cartridge Technology	Separate toner and drum
2	Printing Technology	Laser
3	Type of Printing	Mono
4	Paper Size	A3
5	Print Speed per minute as per ISO/IEC 24734 in (A4) Size - Mono	35
6	Print Speed per minute as per AISsOk/IEGCe2M47m3y 4 in (A4) - Color	0
7	Resolution (Dpi)	600x1200
8	Memory (MB)	2048

9	Hard Disk Capacity (GB)	0
10	Processor Speed	1.2 GHz
11	Duplexing Feature	Yes
12	Duplex Print Speed (IPM)	12
13	Network Connectivity	Yes
14	Network Interface, if available	Ethernet 10/100/1000
15	Wireless Connectivity	No
16	If Yes, Type of Wireless Connectivity	NA
17	USB Port	Yes
18	Number of Main Paper Trays	2
19	Each Main Paper Tray Capacity	500
20	Bypass Tray Facility	Yes
21	If Yes, Bypass Tray Capacity	100
22	Yield of the cartridge/Ink Tank/Ink Pack supplied with Machine as per ISO/IEC: 19798/2007(E) for Cyan colour (Number of prints)	0
23	Yield of the cartridge/Ink Tank/Ink Pack supplied with Machine as per ISO/IEC: 19798/2007€ for YellAoswkcoGleouMrmy (Number of prints)	0
24	Yield of the cartridge/Ink Tank/Ink Pack supplied with Machine as per ISO/IEC: 19798/2007(E) for Magenta colour (Number of prints)	0
25	Yield of the cartridge/Ink Tank/Ink Pack supplied with Machine as per ISO/IEC: 19752/2004(E) for Black (Number of prints)	15000
26	Life of Drum in terms of number of Prints in case of Separate Drum and	0

	Toner cartridge technology -Cyan	
27	Life of Drum in terms of number of Prints in case of Separate Drum and Toner cartridge technology - Yellow	0
28	Life of Drum in terms of number of Prints in case of Separate Drum and Toner cartridge technology - Magenta	0
29	Life of Drum in terms of number of Prints in case of Separate Drum and Toner cartridge technology - Black	82200
30	Duty Cycle (No of Prints/month)	60000
31	Minimum Operating Temperature (Degree C)	10
32	Maximum Operating Temperature (Degree C)	30
33	MinimuAmskOGpeerMat minyg Humidity (%RH)	10
34	Maximum Operating Humidity (% RH)	65
35	BIS Registration under CRS of Meity	Yes
36	BIS Registration no	9397
37	Other Certifications Available	RoHS, CE
38	Dimensions(In mm x mm x mm)	W585 x D660 x H735
39	Weight (In kg)	60
40	On site OEM warranty (Years)	1

E) Slip Printer for cash counter

SL. No	Parameter	Specifications as under or Higher
1	Print Method	9-pin serial impact dot matrix
2	Technology	Serial Impact Dot Matrix
3	Print Speed	At least 4 lps (40 columns, 16.00

		cpi)
4	Column Capacity Receipt	Paper width 76mm, 33/40
5	Character Size	1.2mm (W) x 3.1 mm (H)-1.6 mm (W) x 3.1 mm (H)
6	Character Set	95 Alphanumeric, 48 International, 128 x 12 Graphic
7	Character Per Inch	13.3 cpi / 16 cpi
8	Paper Types	Receipt
9	Copy capability reciept	One copeis plus one original
10	Paper size roll paper	76.00±0.50 (W) mm x dia83.00 mm
		69.50±0.50 (W) mm x dia83.00 mm
		57.50±0.50 (W) mm x dia83.00 mm
11	Interfaces	RS-232, Drawer kick-out, Bidirectional parallel
12	Power Supply	230V, 50 Hz
13	Operating Voltage	24V
14	Safety standards	TUV
15	Sensors	Paper End Sensor
16	On Site OEM Warranty (year)	3

F) UPS -5KVA – 4HRS BACKUP

Sl. No.	Parameter	Specification as under or higher
I	**Generic**	
1	Rating in KVA	5.0 KVA
2	Switching Technology	IGBT-PWM
3	Input Voltage	AC Single phase 160V - 260V 50Hz
4	Switching Technology	AC Single phase 230V +/- 1% 50 Hz
5	Warranty for UPS (Years)	2
II	**Battery/Backup Bank**	
1	Battery/Backup Bank Provided with Online UPS (Hint: In case the UPS is supplied with battery, seller shall ensure compliance to the GST Rates as per recommendations	With Battery

	made in the 45th Meeting of GST council dated 17th Sep 2021)	
2	Type of Battery (hint: NA in case Battery not provided)	SMF-VRLA conforming to JISC:8702(Pt.I,II&III), Stationary Lead Acid Batteries (with tubular positive plates) in monobloc container conforming to IS:13369:1992 latest
3	Backup time (Minutes) (hint: NA in case battery not provided)	240 Minutes
4	Battery Make	EXIDE / AMARARAJA
5	Battery Model Number	EP150-12 / 12AL150
6	Battery capacity (Ah)	150
7	Weight of the Battery (kg)	48.3
8	Number of Batteries	20
9	Minimum Guaranteed VAH	1600 X Per KVA X Per hour of backup time
10	Warranty for battery (Years) by Battery Manufucaturer/Brand hint: NA in case battery not provided	2
11	Accessories with Battery	NA
III	**Installation And Commissioning Or Service**	
1	Installation and Commissioning (Covered in the Scope of Supply)	Provided
3	After sales service (Turn Around Time)	Within 48 hours
4	Preventive Maintenance (Hint: Mention Timeline if provided, NA if not	Quarterly

	provided)	
5	Other Services provided	PAN India service support on 24 x 7 basis, Availability of spares in close proximity (Spares should be easily available close to the site)
IV	**Performance / Functional**	
1	Inbuilt isolation transformer	Without
2	Overall Efficiency (%)	>/=90% & <94% without Inbuilt isolation transformer
3	Power Factor Load Supported	0.8 or better
4	Overload limit	50% Overload for minimum 3 seconds
5	Total Harmonic	3% Maximum @ 100% Linear Load
6	Distortion(THD) (%)	
7	Other Functional Features	Crest factor on full non-linear load is not less than 3:1,Noise level (1 meter distance from UPS) should be less than 70dB,Input power factor at full output load leading to unity with active power factor correction (APFC) >/=0.92,Transient response time (for 100% load change, output must remain within +/-1% and recovery) as <20 milliseconds, Battery recharge time (after complete discharge to 90% charge) and charge rating: Battery recharge time to 90% charge after 100% DoD : 8 to 10 Hours, Maximum overshoot and Under shoot of output rated voltage (in percentage) (4%),Voltage Regulation from no load to

		full load (%) (< / = 2%),UPS input power factor better than 0.95 (at rated voltage)
V	**Accessories**	
1	Accessories	Rack for Batteries
VI	**Salient Features**	
1	Protection	Protection for under voltage at battery terminal, Protection of Over voltage, Short Circuit & over load at UPS output terminal, Over temperature protection
2	Metering	Input Voltage, Output Voltage, Input Frequency, Output Frequency
3	Alarms and Indications	Indicator for Mains presence, Indicator for Battery charging and discharging, Indicator for Output Over Load with Audible Alarm, Indicator for Low Battery Voltage with Audible Alarm, Alarm for Over temperature, Alarm for Low Battery
4	Additional Features	Pure Sinewave AC Output
5	Provide URL of the catalogue	www.numericups.com
VII	**Design / Construction**	
1	Type of Design / Construction	Floor Standing
2	Form factor of UPS	NA (for Floor Standing)
3	Enclosure (mm)	1.0 mm Minimum Thickness of M.S. Sheet duly powder coated
4	Degree of Protection	IP20
5	DC Bus Voltage (In Volts)	240
6	Other Constructional Features	Mains ON/OFF MCB, Inverter reset push button,

		Static by pass facility, UPS shall be free from workmanship defects, sharp edges, nicks, scratches, burst, etc. All fasteners shall be fixed properly. The equipment shall be complete with all parts and all parts shall be functional
VIII	**Operating Conditions**	
1	Minimum Operating Temperature	0 degree Celsius
2	Maximum Operating Temperature	40 degree Celsius
3	Relative Humidity Non Condensing at 40 deg C	90 percent
IX	**Buyer Specific Requirement**	
1	Environmental Test Report Requirements	NA
2	Battery Test Report	NA
3	Intended Applications	Critical Infrastructure, Network IT Equipment, Medical Equipment, Support for Data Centers, Network operating centers, Security operation centers, State and District centers, Command and Control center etc., across the Country to provide impetus to the e-Governance services e.g. Public food distribution, e Way bill, Counseling, e-Office, IVFRT etc., services under Digital India Programme, NA
4	Other Requirements	ROHS compliance, KW rating shall be 0.8 time of KVA rating
X	**Reports And Certification**	

1	Type of lab which carried out Test of Complete Product to prove the conformity of product as per specification	Govt Lab
2	Agree to provide all relevant documents Test Reports/supporting document /reports etc to the buyer at the time of bidding or on demand	Yes
3	As per Meity (Government of India) guidelines UPS shall have valid BIS CRS certifications as applicable	Yes (For UPS rating upto 10KVA)

G) UPS 2KVA – 3 HOURS BACK UP

Sl. No.	Parameter	Specification as under or higher
I	**Generic**	
1	Rating in KVA	2.0 KVA
2	Switching Technology	IGBT-PWM
3	Input Voltage	AC Single phase 160V - 260V 50Hz
4	Output Voltage	AC Single phase 230V +/- 1% 50 Hz
5	Warranty for UPS (Years)	2
II	**Battery/Backup Bank**	
1	Battery/Backup Bank Provided	With Battery

	with Online UPS (Hint: In case the UPS is supplied with battery, seller shall ensure compliance to the GST Rates as per recommendations made in the 45th Meeting of GST council dated 17th Sep 2021)	
2	Type of Battery (hint: NA in case Battery not provided)	SMF-VRLA conforming to JISC:8702(Pt.I,II&III), Stationary Lead Acid Batteries (with tubular positive plates) in monobloc container conforming to IS:13369:1992 latest
3	Backup time (Minutes) (hint: NA in case battery not provided)	180 Minutes
4	Battery Make	EXIDE / AMARARAJA
5	Battery Model Number	EP100-12 / 12AL100N
6	Battery capacity (Ah)	100
7	Weight of the Battery (kg)	As per Manufacturer’s standard
8	Number of Batteries	8
9	Minimum Guaranteed VAH	1600 X Per KVA X Per hour of backup time
10	Warranty for battery (Years) by Battery Manufucaturer/Brand hint: NA in case battery not provided	2

11	Accessories with Battery	NA
III	**Installation And Commissioning Or Service**	
1	Installation and Commissioning (Covered in the Scope of Supply)	Provided
2	After sales service (Turn Around Time)	Within 48 hours
3	Preventive Maintenance (Hint: Mention Timeline if provided, NA if not provided)	Quarterly
4	Other Services provided	PAN India service support on 24 x 7 basis, Availability of spares in close proximity (Spares should be easily available close to the site)
IV	**Performance / Functional**	
1	Inbuilt isolation transformer	Without
2	Overall Efficiency (%)	>/=90% & <94% without Inbuilt isolation transformer
3	Power Factor Load Supported	0.8 or better
4	Overload limit	50% Overload for minimum 3 seconds
5	Total Harmonic Distortion(THD) (%)	3% Maximum @ 100% Linear Load
6	Other Functional Features	Crest factor on full non-linear load is not less than 3:1,Noise level (1 meter distance from UPS) should be less than 70dB,Input power factor at full output load leading to unity with

		active power factor correction (APFC) >/=0.92,Transient response time (for 100% load change, output must remain within +/-1% and recovery) as <20 milliseconds, Battery recharge time (after complete discharge to 90% charge) and charge rating: Battery recharge time to 90% charge after 100% DoD : 8 to 10 Hours, Maximum overshoot and Under shoot of output rated voltage (in percentage) (4%),Voltage Regulation from no load to full load (%) (< / = 2%),UPS input power factor better than 0.95 (at rated voltage)
V	**Accessories**	
1	Accessories	Rack for Batteries
VI	**Salient Features**	
1	Protection	Protection for under voltage at battery terminal, Protection of Over voltage, Short Circuit & over load at UPS output terminal, Over temperature protection
2	Metering	Input Voltage, Output Voltage, Input Frequency, Output Frequency
3	Alarms and Indications	Indicator for Mains presence, Indicator for Battery charging and discharging, Indicator for Output Over Load with Audible Alarm, Indicator for Low Battery Voltage with Audible Alarm, Alarm for Over temperature, Alarm for Low Battery

4	Additional Features	Pure Sinewave AC Output
5	Provide URL of the catalogue	www.numericups.com
VII	**Design / Construction**	
1	Type of Design / Construction	Floor Standing
2	Form factor of UPS	NA (for Floor Standing)
3	Enclosure (mm)	1.0 mm Minimum Thickness of M.S. Sheet duly powder coated
4	Degree of Protection	IP20
5	DC Bus Voltage (In Volts)	96
6	Other Constructional Features	Battery Fuse, Inverter reset push button, Static by pass facility, UPS shall be free from workmanship defects, sharp edges, nicks, scratches, burst, etc. All fasteners shall be fixed properly. The equipment shall be complete with all parts and all parts shall be functional
VIII	**Operating Conditions**	
1	Minimum Operating Temperature	0 degree Celsius
2	Maximum Operating Temperature	40 degree Celsius
3	Relative Humidity Non Condensing at 40 deg C	90 percent
IX	**Buyer Specific Requirement**	
1	Environmental Test Report Requirements	NA
2	Battery Test	NA

	Report	
3	Intended Applications	Critical Infrastructure, Network IT Equipment, Medical Equipment, Support for Data Centers, Network operating centers, Security operation centers, State and District centers, Command and Control center etc., across the Country to provide impetus to the e-Governance services e.g. Public food distribution, e Way bill, Counseling, e-Office, IVFRT etc., services under Digital India Programme
4	Other Requirements	ROHS compliance, KW rating shall be 0.8 time of KVA rating
X	**Reports And Certification**	
1	Type of lab which carried out Test of Complete Product to prove the conformity of product as per specification	Govt Lab
2	Agree to provide all relevant documents Test Reports/supporting document /reports etc to the buyer at the time of bidding or on demand	Yes
3	As per Meity (Government of India) guidelines UPS shall have valid BIS CRS certifications as	Yes (For UPS rating upto 10KVA)

	applicable	

H) BAR CODE READER

SL No.	Parameter	Specifications as under or Higher
1	Form Factor	Hand Held
2	Type	Corded
3	Scan System	Linear Imager
4	Scan Rate (Scans per second/ frames per second	350
5	Communication Interface	USB
6	Print Contrast Ratio (%)	20
7	Resolution (mil)	3
8	Bar Code Density (mil)	3
9	Minimum Depth of Field (mm)	30
10	Maximum Depth of Field (mm)	400
11	Ambient Light Immunity (Lux)	5000
12	Light Source (mm)	632
13	Compatible Bar code Symbologies: (UPC-A/UPC-E, EAN 13, JAN-13, CODABAR, ADD-ON-2, code-93, Industrial Codes, Interleaved 2 or 5, EAN 128 etc)	Yes
14	Working Range (meters)	1.6
15	Power Supply/Battery	170mA
16	Housing Material of Scanner	Reinforced Plastic
17	Drop Resistance (Ft)	5.9
18	Operating Temperature Range (Degree C)	−10 c to 50 c
19	Operating Humidity (%RH)	20% to 95%
20	IP Raing	54
21	Safety Certifications	BIS
22	Bright LED and Beeper with adjustable volume	Yes
23	Hands free stand	Yes
24	Should be able to record/scan even poorly pinted scan.	Yes
25	Should communicate through USB port.	Yes
26	On Site OEM Warranty (Year)	3

I) THERMAL PAPER FOR SPOT BILLING

1	Width (mm)	76mm
2	Diameter(mm)	34mm
3	Basic weight (GSM)	70 GSM (Min)

4	Core diameter Outer/Inner(mm)	Outer 16mm/ Inner14mm
5	Length of each roll (Meters)	10 Meters
6	Length of each bill (Meters)/ No. of bills per roll	0.25 Mtrs /10 inch
7	Printing font size(Bill Portion)	14
8	Printing font size(Instructions portion)	14
9	Calliper (Um)	61
10	Brightness (%)	83%
11	Smoothness	550
12	Tensile strength	MD125
13	Tear strength	MD 200
14	Static Imaging(color) test	Max 0.2
15	Dynamic Imaging(color) test	Min 1.10
16	Thermal Resistance (Blank/Imaged)	Max 0.2 Min 1.0
17	Moisture Resistance (Blank/Imaged)	Max 0.2 Min 1.0
18	Light Resistance (Blank/Imaged)	Max 0.2 Min 1.0
19	Printing method	UV method
20	Printing ink	RNC type by F&K TOKA or any similar ink
21	Impression	99.90%
22	Dynamics color response 0.32 mj/ dot: min1.10	
23	Static color response(70 deg C) :Max 0.2	
24	Tearing sensors at the end of each bill	
25	Up to Double side pre-printing required	
Note: BESCOM reserves right to vary the length & contents, include Advertisements in the form Text or pictures or both Text and pictures, either in black and white or in colour without any additional cost implication to BESCOM		

Annexure-III List of Installation

Zone Name	Circle Name	Division Name	Sub-Division Name	Live Installations	Long Dis / Permanent Dis Installations	Cash Counters
BRAZ	BANGALORE RURAL	HOSAKOTE	AVALAHALLI	106889	21271	1
			DEVANAHALLI	69276	25106	1
			HOSAKOTE	79862	24127	1
			NANDAGUDI	15866	8325	1
			SULIBELE OMU	15841	4543	1
			VIDYANAGAR	55412	14127	1
			VIJAYAPURA OMU 1	27967	5941	1
		NELAMANGALA	DABASPETE	42978	15355	1
			DODDABALAPURA (R)	47354	19433	1
			DODDABALAPURA (U)	33497	4294	1
			NELAMANGALA	174717	41416	1
	BANGALORE RURAL Total			**669659**	**183938**	**11**
	KOLAR	CHIKKABALLAPURA	BAGEPALLI	42476	9558	1
			CHELURU OMU	23692	4923	1
			CHIKKABALLAPURA RURAL	31130	10616	1
			CHIKKABALLAPURA URBAN	27518	9815	1
			GOWRIBIDANUR	42098	12607	1
			GUDIBANDE	21494	3667	1
			MANCHENAHALLI OMU	20602	3690	1
			VATADAHOSAHALLI OMU	19931	2536	1
		CHINTHAMANI	BATTALHALLI OMU	20468	5172	1
			CHINTHAMANI RURAL	11880	2652	1
			CHINTHAMANI URBAN	27497	5863	1
			JANGAMAKOTE OMU 1	17897	6840	1
			KAIWARA OMU 1	20090	4172	1

			SHIDLAGATTA RURAL	26330	8750	1
			SHIDLAGATTA URBAN	18344	5543	1
		KGF	BANGARAPETE	54525	11945	1
			BETHAMANGLA	28377	7492	1
			KGF	15729	1585	1
			MALUR	100511	29067	1
			MULABAGILU	69110	22437	1
		KOLAR	KOLAR RURAL	73410	21145	1
			KOLAR URBAN	20627	15005	1
			SRINIVASAPURA	66184	26293	1
	KOLAR Total			**799920**	**231373**	**23**
	RAMA NAGAR	CHANDA PURA	ANEKAL	17241	5827	1
			ATTIBELE	45454	7555	1
			CHANDAPURA	119589	16374	1
			JIGANI	86298	18692	1
			SARJAPURA OMU	58445	10632	1
			VEERASANDRA	82330	12649	1
		KANAKA PUR	HAROHALLY	38509	9005	1
			KANAKAPUR RURAL	28767	6296	1
			KANAKAPUR URBAN	35626	9087	1
			SATHANURU	32926	4110	1
		MAGADI	KUDUR	41420	18515	1
			MAGADI	42363	12257	1
			TAVAREKERE	59836	16083	1
		RAMANA GAR	BEVOORU	20153	3157	1
			BIDADI	43092	11039	1
			CHANNAPATNA RURAL	43880	10401	1
			CHANNAPATNA URBAN	8752	3045	1
			RAMANAGARA RURAL	35002	5202	1
			RAMANAGARA URBAN	3992	704	1
	RAMA NAGAR Total			**843675**	**180630**	**19**
BRAZ Total				**2313254**	**595941**	**53**
CTAZ	DAVANAGERE	CHITRAD URGA	BARAMASAGARA OMU	30339	5795	1
			CHIKKAJAJURU	21011	3614	1

			OMU			
			CHITRADURGA RURAL	23453	2958	1
			CHITRADURGA URBAN	44324	9739	1
			HIREGUNTANUR OMU	16309	3208	1
			HOLALKERE	41666	7377	1
			HOSADURGA	59218	10651	1
			MALLADIHALLI OMU	19343	2846	1
			SRIRAMPURA	36957	4588	1
		DAVAN A GERE	ANAGODU	52432	6274	1
			BASAVAPATNA OMU	17237	2046	1
			BILICHODU OMU	18631	2772	1
			CHANNAGIRI	51707	6528	1
			DAVANAGERE RURAL	50567	9259	1
			JAGALURU	38421	9001	1
			KUKKAWADA OMU	16786	1857	1
			NALLURU OMU	20045	3054	1
			SANTEBENNUR	31499	4326	1
			TYAVANAGI OMU	19128	3040	1
		HARIHA RA	HARAPANAHALLI	32568	4242	1
			HARIHARA	31455	5068	1
			HONNALI	58974	12248	1
			MALEBENNUR OMU	27812	5862	1
			NYAMATHI	35013	5880	1
			TELIGI	52006	7262	1
		HIRIYU RU	CHALLAKERE	50766	10776	1
			HARIYABBE OMU	19054	4357	1
			HIRIYUR	45248	8865	1
			IMANGALA OMU	17502	3841	1
			MOLAKALMURU	21670	3384	1
			RAMPURA OMU	21075	2303	1
			TALAKU	40888	8251	1
	DAVANA GERE Circle Total			**1063104**	**181272**	**32**
	TUMKUR	KUNIGA L	AMRUTHURU OMU	13195	3537	1
			HULIYURDURGA	33277	5315	1

			KUNIGAL	32842	11284	1
			YEDIYUR	12195	2199	1
		MADHUGIRI	BADAVANAHALLI OMU 1	20166	3093	1
			BYALA OMU	12584	2716	1
			HOLAVANAHALLI OMU	16072	3047	1
			KALLAMBELLA OMU	26301	4369	1
			KODIGENAHALLY	19125	4199	1
			KORATAGERE	52813	10689	1
			MADHUGIRI	37776	9380	1
			MANGALAVADA OMU	11227	2741	1
			MIDIGESHI OMU	12365	2263	1
			PATTANAYAKANAHALLI OMU	21310	6433	1
			PAVAGADA	46569	16722	1
			SIRA RURAL	26828	4351	1
			SIRA URBAN	17756	4585	1
			YN HOSAKOTTE OMU	12686	4703	1
		TIPTUR	BILIGERE OMU	13072	1955	1
			CN HALLY	31784	6203	1
			DANDINASHIVARA OMU	21239	3073	1
			HANDANAKERE OMU	11628	1852	1
			HONNAVALLI OMU	10991	1491	1
			HULIYARA OMU 1	32786	5651	1
			MAYASANDRA OMU	22394	3508	1
			NONAVINAKERE OMU	20097	2586	1
			THIMMANAALLY OMU	13933	2279	1
			TIPTUR	32220	9257	1
			TURUVEKERE	47696	6565	1
		TUMKUR	CHELUR OMU	20517	2665	1
			CS PURA OMU	19361	4472	1
			GOOLURU OMU	11983	2950	1
			GUBBI	29888	7045	1
			HEBBURU OMU	22254	5095	1
			HOSAKERE OMU	18879	2440	1
			KADABA OMU	16814	2194	1
			KYATSANDRA	34153	7972	1

			NITTUR	21129	3876	1
			TUMKUR RURAL SUB DIVISION1	38786	8168	1
			TUMKUR RURAL SUB DIVISION2	15010	8413	1
			TUMKUR URBAN SUB DIVISION1	15438	2675	1
			TUMKUR URBAN SUB DIVISION2	4346	802	1
	TUMKUR Circle Total			**951485**	**204813**	**42**
CTAZ Total				**2014589**	**386085**	**74**
Grand Total				**4327843**	**982026**	**127**

Annexure-IV

BID FORM

Ref No :- **Dated :-**

From :-

To :-

The General Manager (Customer Relations),
Bangalore Electricity Supply
Company Limited, Corporate Office,
K. R. Circle,
Bengaluru – 560 001.

Sir,

Having examined and understood the General Conditions of the Contract and the Technical Specifications in the Bidding documents issued under Bid Enquiry No. **BESCOM/2023-24/OW/WORK_INDENT149 dated 05.03.2024** for total service inclusive of supply of software hardware, Manpower and stationaries for issue of consumer bills, supplementary bills and other activities in Non-RAPDRP BESCOM Area including annual maintenance. We the undersigned hereby submit the fully completed Bid documents, which includes the

a) EMD Declaration,
b) Qualifying requirements
c) Technical and Commercial details,
d) Price Bids in e-portal, for the said Materials/ Services.

We hereby agree to supply the materials /carry out the services in conformity with the technical specification enumerated in the Bidding Documents, for the sum stated and quoted in the Bid or such other sums as may be ascertained in accordance We undertake, if our Bid is accepted, to execute the contract with in the stipulated time with the Schedule of Prices uploaded in e-portal and made part of the Bid.

We note that the prices offered are (as per the Bid stipulation) FIRM throughout the period of contract including extended period if any as per the commercial terms and conditions. We agree to keep this Bid valid for a period of 180days from the date fixed for Bid opening and it shall remain binding upon us and may be accepted at any time before expiration of that period.

Until a formal contract is prepared & executed, this Bid together with your written acceptance thereof in your notification of Award shall constitute a binding contract between us.

Dated this day of 2024

Signature
Name in Block Letters
Designation
Firm Name
Date

Annexure-V

Bidder Information's

Sr No	Particulars	Details
1	Name of the Bidder organization	
2	Address of the Bidder (Documentary Evidence as per KYC needs to attached)	
3	Status of the Company (Public Ltd/ Pvt. Ltd) (Documentary Evidence needs to attached)	
4	Details of Incorporation of the Company(Documentary Evidence needs to attached	
5	Details of Commencement of Business(Documentary Evidence needs to attached)	
6	Valid GST registration no. (Documentary Evidence needs to attached)	
7	Valid Service tax registration no. (Documentary Evidence needs to attached)	
8	Permanent Account Number (PAN) (Documentary Evidence needs to attached)	
9	Name & Designation of the contact person to whom all references shall be made regarding this	
10	Telephone No. (with STD Code)	

11	E-Mail of the contact person:	
12	Fax No. (with STD Code)	

Signature
Name in Block Letters Designation
Firm
Name
Date

Annexure-VI
Manufacturer's Authorization Format (MAF) from OEM for TRM Solution
(To be submitted on the Company letter head)

To,
The General Manager (Customer Relations)
Corporate Office, BESCOM,
K R Circle,
Bengaluru – 560 001, Karnataka, India

Date: __/__/2023

Sub: Submission of the response to the tender No. : **BESCOM/2023-24/OW/WORK_INDENT149 dated 05.03.2024** for **Implementation of Smart Business Management System by providing Web Based Total Revenue Management (TRM) Modules, GIS, BI & Analytical tools and other modules along with supply of Hardware, Software, Man Power, Stationaries and Consumables on the basis of System as a Service (SaaS) and other allied services in Sub-Divisions and Accounting Sections of Non-RAPDRP areas in Chitradurga Area Zone (CTAZ) and Bangalore Rural Area Zone (BRAZ)** for a Period of 2+1 Years

Dear Sir,

We, (OEM Name) having our registered office at (OEM Address), hereinafter referred to as OEM are an established Total Revenue Management (TRM)/ Billing & Collection Solution (MBC) solution provider of the following items quoted by (Bidder Name) having their registered office at (Bidder Address), hereinafter referred to as Bidder.

We (OEM Name) authorize to quote our product for above mentioned tender as our Authorized Indian Agent.

We confirm that we have understood the delivery & installation time lines defined in the RFP. We confirm that we have made a board resolution which is attached with this MAF and worked out all necessary logistics and pricing agreement with (Bidder Name), and there won't be any delay in delivery, installation and support due to any delay from our side.
Our full support as per pre-purchased support Contract is extended in all respects for supply, warranty and maintenance of our products. We also ensure to provide the required spares and service support as pre-purchased for the supplied equipment for Contract Term. In case of any difficulties in logging complaint at bidder end, user shall have option to log complaint at our call support centre.

If any product is declared end of sale, we shall proactively ensure that a suitable equivalent or higher roll over product is offered through the existing Bidder to department for due approval, empanelment and order executions thereafter.

We understand that any false information/ commitment/ non-performance provided by the bidder or Us may result (OEM Name) in getting debarred/ Blacklisting/ Termination from doing business with BESCOM.

Yours sincerely,

For <OEM/ Manufacturer name>

Authorized Signature [In full and initials]: _____

Enclosed:

1. Board resolution No: _____ Dated:_____

Annexure-VII

Manufacturer's Authorization form (MAF)
(To be submitted on the Letterhead)

To,
The General Manager (Customer Relations)
Corporate Office, BESCOM,
K R Circle,
Bengaluru – 560 001, Karnataka, India

Sub: Manufacturers Authorization Form for Android OS based Integrated Spot billing Device

Tender Enquiry No:

Dear Sir,

We, M/s _____ who are established and reputable manufacturers of Android OS Based integrated Spot Billing Devices (SBD) having specification similar/better as specified in the bid document, having production unit at _____ do hereby authorize M/s ..... (Name and address of Supplier/Dealer) to offer their quotation, negotiate and conclude the contract with you against the above invitation for tender offer. Further, hereby we confirm that we comply to all the necessary qualification requirement as per the tender and we are submitting all the required self-attested documentary evidences to fulfil the tender condition through supplier/dealer. We hereby extend our full guarantee and warranty for 2+1 years as per terms and conditions of the RFP and the contract for the equipment and services offered against this invitation for RFP offer by the above firm. Further, we hereby undertake if any false representation is made or if we default in supply and service including quality/performance of the above equipment, BESCOM reserves the right to blacklist, terminate, Recovery of the damages of the contract both supplier and OEM.

Yours faithfully,

Name and Title of Signatory:

M/s..... (Name of manufactures)
Company Name:
Address:
Place:
Date:
Company Seal

Annexure-VIII

IN the Technical Specifications of this tender, if any of the following software functionalities are not covered, same are deemed to be included in the Technical specifications.

SOFTWARE SHALL HAVE THE FOLLOWING FUNCTIONALITIES:

1. DATABASE:

	The data base shall cover master file of consumer comprising of consumer's personal details, premises details, and location details. Location details shall contain geographical information, local authority information, Electrical information , Infrastructure details , Power sanction & service details, Deposit details etc., to support New Connection, tariff structure (For example: Present Tariff structure is based on Local authority basis,) and various MIS reports.
	Shall provide to enter/update new connections/ Temporary connection/ Additional load/ Load reduction/ Name change/ Tariff Change /Sanction of various Rebates/ Merging of load/ Load bifurcation. Support mass update.
	System shall also maintain History of energy meters, CT/PT Ratio, meter reading, energy consumption, energy assessments, billing, payments, cancellations, adjustments, deposits/additional deposits, addition/reduction of sanctioned load/Contract Demands , change in Name and Tariff changes both consumer initiated and tariff driven or company initiated
	Each consumer shall be allotted sequential unique identity number generated during consumer indexing so that with the help of that identity number it should be possible to identify the Consumer, Office, Feeder, Distribution Transformer and the substation feeding the consumer.
	Existing RR No. shall be printed along with Unique Identity Number in all the bills/correspondence.
	Ensure easy and convenient platform to integrate with indexed geographical and Electrical database. The two systems have to work in total unison such that any revision of data in one of the system should automatically update into related information in the other without any conflict.
	BESCOM will provide the existing customer related information as available on records. Complete data of the entire system for the past 2 years must be available on server. All transactional Data of prior period shall be auto archived as per the Archive policy of BESCOM with a provision to retrieve the same as and when needed. Detail procedure has to be furnished to retrieve and use past data. Movement of Accounts from Live (Active) to Inactive & Annulled shall be driven through a process chain stipulated by the Regulations and norms of the BESCOM
	Shall support for incremental migration of all records maintained in books/missing records during migration/ manually operated new

	connections. A standard electronic format for the purpose shall be provided.

2. NEW CONNECTION:

The software should be capable to implement the following features:

1) Online acceptance of all LT/HT applications based on customer category via BESCOM website for New connection/ multiple connections and able to accept requests for Additional load, Reduction of load, SOLAR ROOF TOP, Temporary Connection, Name change, Tariff change and category change, Load merging, Load bifurcation, Sanction of rebates etc.

2) Collection of registration fee online by integrating with the payment gateways/ other mode in which BESCOM wishes to provide collection facilities based on the customer category and number of connections requested by applicant upon submission of necessary documents as per conditions of supply, demand note creation, providing acknowledgement to applicant upon payment of registration fee. Also capable to intimate the customer to submit the pending documents required for registration.

3) The system should be capable to generate SMSs/ Emails/ other modes Notifications in which BESCOM wishes to provide services to the consumers for making payments/ intimating bill due date etc.

4) The system should be capable of accepting the customer details and then check the applicant's particulars against the set of existing customers, defaulted customers, disconnected and rejected applications. In case of a match in records, an exception should be raised. This exception should be flagged off to the relevant approving authority for clearance. After clearance from approving authority, the application will be processed further or the same will be rejected. System should be capable to verify the debt/ arrears/pending payments if any by checking against existing customer/flat/site database by integrating with existing database to clear pending payments if any exists.

5) The System should be capable to integrate with GIS to carry out field activity by the field officials to check the technical feasibility of DTCs, Feeders etc and also support estimation preparation/sanction and work accounts and provision to issue intimation letter to customer for premise inspection.

6) The System should be capable to issue power sanction letter for Self-execution, Utility execution and Layouts/Abandoned Layouts works. Power sanction letter should auto calculate estimation, supervision charges, ISD, AISD, MSD, SLC, BMRDA charges and other charges as applicable as per CoS.

7) The System should be capable to collect payments through On-line /cash counters/through TPP agencies/facilitation Centres before work execution within the expiry date of application, renewal on customer requests within expiry date by considering request to be renewed not more than once with payment of re-registration fee as per CoS with approvals as per DoP, Also support cancellations, refund of deposit as per norms in force.

8) The System should be capable to capture the status of joint inventory for work completion as per CoS, documents to be accepted for LEC Completion Report, Agreement, Wiring Diagram, undertaking for having installed Solar water heater etc, execution of indemnity bond if require as per CoS.

9) The System should be capable to issue work order and Meter procurement letter as per CoS, capture of period required to provide power supply, pre-commission test status etc, generation of Service certificate for Successful, rescheduling of inspection for unsuccessful by collecting re-inspection charges etc.

10) The System should be capable to capture the status of the applicant in case fails to fulfil the above requirements within stipulated time and is not ready to avail supply; application is treated as cancelled, registration and processing fee stand forfeited.

11) Provision shall be available to the consumers to check the status (Tracking) of their application.

12) Algorithms shall be approved by BESCOM

Note: Expansion:
1) CoS - Conditions of Supply
2) DoP - Delegation of Powers
3) LEC - Licensed Electrical Contractor
4) GIS - Geographical Information system
5) DTC - Distribution transformer center
6) HT –High Tension
7) ISD - Initial security deposit
8) MSD - Meter security deposit
9) SLC - Service line charges
10) BMRDA - Bangalore Metropolitan Regional Development Authority
11) LT - Low tension
12) CCB - Customer care and billing
13) RAPDRP - Restructured accelerated power distribution reforms programme
14) TRM - Total revenue management

3. METER READING:

1	***Capable to Collect of meter readings in the metering database from remote meters of:***
	• Feeders
	• Distribution Transformers`
	• HT consumers
	• LT consumers
2	***Capable of upload & down load for a set/group of consumers through:***
	• Android OS based integrated Spot Billing Device for real-time updating of data
	• CMRI
	• Manual uploads of readings for individual consumer or group of consumers on a single screen say for example:- set of consumers of one Meter Reader for one reading date,
3	***The system should be able to interface with Automatic online Meter Reading devices.***
4	***Should have Validation checks on :***
	• Abnormal and subnormal consumption
	• Dial over or rotation complete
	• Present reading less than previous reading
	• Meters not read (due to various exception)

5	***Provision shall be available for :***
	• Data review
	• edit & updates
	• Audit trails
6	***Shall have AMR Compatibility:***
	• Able to interface with AMR device
	• Capable to schedule & down load readings
	• Capable of generating exception reports • Capable to bill the installations based on the readings directly downloaded from the meter through optical port. • Compatible for RF/IR meters
7	***Validations for the spot metering & billing data updated.***
	• Meter reading validations in SMART PHONESs
	• Validation of uploaded data in system
8	***Prohibiting the wrong entry***
	• Prompting the meter reader from entering wrong reading
9	***Meter Reader Tour plan (MRTP) generation***
	• Generation of meter reading plan(schedule) for a day/week/fortnight
	• Creation of new reading dates
	• Creation of new meter readers
	• Transfer betn. reading dates (single/mass)
	• Transfer betn. Meter readers (single/mass)
	• Creation of down load files for spot redg. , billing, collection and disconnection
	• Down load & upload at SDO/SO levels
	• Assigning SMART PHONESs to each of the MRs
	• Log details of CMRI/HHC assigned to MRs
	• Tracking performance of MRs
	• Generation of optimum route plan (meter reader walking order) with option to modification through insertion or deletion.
10	***Monitoring meter readings***
	• Tracking of down loads & uploads within a time frame
	• Generation of exceptions in case of non-compliance of the above
	• Upload & down delays should get clearance from the designated authority
	• MR wise performance report
11	***Monitoring customer exceptions***
	• Exception reports (repeated meter changes, MBOs, DLs, prejudicial usage etc.,)
12	***Supporting meter reading on trust***
	• Provision to capture reading received over phone
	• Provision to capture reading received over Fax
	• Provision to capture reading received over web

	• Incorporation for billing
	• **Generation of exception reports**
13	***Overdue alerts***
	• Overdue alerts for meter readings (Ex: SMS to MRs)
14	***Accept change metering***
	• Single phase to 3-phase and vice versa
	• ETV to non-ETV
	• Pre-paid to regular & vice versa
	• Manual to AMR
15	***Capability to store data for specified period***
16	***Interfacing with spot billing and MRI***
	• Support download & upload
	• Devices to provide MR code, RRNo., meter no. ,Bill details, date & time stamp
17	***Meter reading for temporary connections***
	• Accepting opening, intermediate & final readings
	• Generation of bills with due date
	• Generation of renewals
18	***Final reading for closure of connection***
	• Consumer initiated disconnection
	• Utility initiated disconnection
	• Provision to accept out of cycle and support billing
	Support for mass replacement, Updating of meter change details & Support billing
	Support for Updating of rating results & support billing
19	***Tracking meter location:***
	• In consumer premises
	• Under seizure (theft case)
	• Missing or stolen
20	***Tracking meter Status***
	• Working in good condition
	• MNR
	• MBO
	• DL
	• Sluggish
	• Creeping
	• Tampering
21	***Tracking meter /Meter boxes seals***
	• Reconciliation of Meter condition
	• Reconciliation of Meter box
	• Reconciliation of Meter seals
	• (Link from NC to Inspection/rating/M/c)

4. BILLING INCLUDING SPOT BILLING:

1	*Bill shall have automatic system generated number & date*
2	***Bill calculation logic***
	• BESCOM will provide Tariff book & KERC Conditions of Supply
	• Flexible for billing logic changes through central location
	• should be possible for manual modification
	• Support part bill
	• Support final bills
	• Flexible for changes to billing cycle
	• bill is available in soft & hard copy
	• Capable for **individual bill** generation
	• Capable for **Mass bill generation (Group billing)**
	• keeping disputed amount under deferral or hold with or without Interest
	Support, rebates like solar/Orphanage/handicap/High voltage etc., as per tariff order in force.
3	***Transfer in billing logic***
	• Transfer from postpaid to prepaid and vice versa,
	• un-metered to metered
	• Kwh to Kvah & vice versa
4	***Meter data validation***
	• Identifying meter tampering , alerts to users
	• Identifying faulty meters & estimation of consumption
	• Accommodate multiple meter changes in a single billing cycle,
5	***Bar code generation***
	• Use code 39 or any other universal std.
	• support alphanumeric & other spl characters
	• Output in local language is preferred.
6	***Billing logic down load***
	• Billing logic down loads to SMART PHONES
	• support walking sequence (spot serial)
7	***Bill printing based on dispatch sequence***
	• Automatically select & print in desirable sequence
8	***Group billing***
	• common bill for a set of consumers having same due date
	• Bill of multiple premises on a single bill
9	***Bill printing flexibility***
	• support printing at work station or bases billing centre
10	***Use of pre-printed stationery or printing on plain paper***
	• ***Use of pre-printed stationery and printing the entire bill and payment matter***
	• support print on plain paper
	• support multiple language English & Kannada or Kannada Only
11	***Interfacing with manual billing:***
	• capable to capture inputs manually to update customer database on bills with reasons
12	***Bill on demand***
	• Generate duplicate bills at Back office though SMART PHONES and system side
	• support printing of past bills of any 3-years
13	***Bill correction/amendment provisions***
	• Support manual/auto bill cancellation of current and past bills as per BESCOM requirement. To maintain history of frozen and

5. COLLECTION:

1	***Decentralized payment processing & centralised reconcilliation***
	• System to handle centralized payments
	• System to handle decentralized payments
	• capable of centralized reconciliation of collection
2	***Linking payment to logging id***
	• system to capture payment details
	• Association of logging ids of persons receiving payments
	• Association of logging ids of collection centers receiving payments
	• collection should be against specific bills/forms
3	***Mandatory reason codes***
	• pre-defined reason code embedded for the user for having collected the payments without bill/form of all instances
4	***Code based collection***
	• Classify collection against standard accounting codes (purpose) (GL codes)
5	***Receipt generation***
	• Each receipt should have sequential unique receipt number
	• Support printing on thermal paper/ordinary paper/pre-printed stationery
	• Output shall be in multiple language Kannada/English
6	***Adaptability to different mode of collection***
	• **Capable to receive/Support:**
	➢ Cash
	➢ Cheque
	➢ Demand draft
	➢ Credit card
	➢ Debit card
	➢ NEFT/RTGS
	➢ Wallets
	➢ E-payments
	➢ Online transfers/ Net banking
	➢ ECS
	➢ Advance payments without bill
	➢ Third Party Payment Agencies (TPPs) (Ex: Karnataka One/ATP/Bill desk/Bill Junction/Easy Bill/ Post Office/Mobile App/IMPS etc.)
	➢ Single cheque against multiple payment & its track
	➢ Automatic information (SMS) on receipt of payment
	➢ Mass updating of Hand Receipts(HRT)
	➢ Group Billing and Group Pament
	➢ Any Where payment (AWP)
7	***Handling of Cheque***

	• Recognition of payment on receipt drawl date
	• Ch. Dishonor : Reversal of payment,
	• Ch. Dishonor : levy of handling charges
	• Ch. Dishonor : Notice generation
	• Ch. Dishonor : blocking from making cheque payment in future with appropriate message in the bill
	• Ch. Dishonor : Option to restoration of cheque payment facility
	• **Support transfer of payment from one installation to another installation**
	• **Support transfer of payments from suspense accounts to RR Nos, RR NO to Write Back and Write Off accounts as per the requirement of BESCOM**
8	***Daily reconciliation of cach and bank***
	• handle daily reconciliation
	• bank remittance
	• reconciliation with bank statement
	• Cash Balance Report/Bank Reconciliation Report
9	***Acceptance of part/ advance payments***
	• flexibility to accept part payment
	• flexibility to accept full payment
	• provision to change these settings centrally
10	***Interfacing with special drives/Spot collection/mobile van collection***
	• handle spot collection with facility to issue receipts through integrated SBD as described in para 8 (d) of the tender
11	***Generation of reminders/disconnection notice***
	• System to generate reminder SMS for due date, dis, dismantling.
	• System to generate reminder letters due date, dis, dismantling.
12	***System ability to keep track of cancelled receipt***
	• capable to cancel receipt before cash close, should not allow to cancel after the cash collection once the counter is closed.
	• keep details in the system
	• print the same on the new receipt
	• transfer from one account to another account

5.DISCONNECTION & RECONNECTION:

1	***Generation of disconnection list as per COS and facility to bulk updation on a single screen:***
	• Exclude exception cases -Open compts pending in customer care/court/other forums
	• Support clasification of customers under live , temp dis, permanent dis, annulled customers. Sub-category for permanent dis consumers having arrears pending viz, Form A, Form B & Form C issued, Write off,
	• Prioritize cases based on default amount /Age /Meter Reader/Section office/Sub-division/Tariff/Reading day wise or in any combination

	• Capturing of non-disconnection reasons
	• system to capture pre-defined non-disconnection reasons
	• provision to add/delete/update the reasons
2	***Support Payment extensions (Govt)***
3	***Support payment in installments***
4	***Auto generation of reconnection list, and facility to bulk updation on a single screen as per the requirement of company and auto levy of Reconnection fee***
5	***Generation of dismantling list for removal of meter and service line, support bulk Updation of dismantlement status for deduction from Security Deposit automatically.***
6	***Trigger for Security deposit adjustment***
7	***Support Automatic Recovery process viz., termination of notice, Final bill with adjustment of deposits , Form-A, B & C and write-off of arrears once the installation is disconnected for payment default and auto cancellation of recovery process on receipt of payment before the expiry of termination notice.***
8	***Support to carry forward recovery process to all migrated inactive installations from the stage where it is left over.***
9	***Payment recognition to happen on real time basis***
10	***Raise exception to field staff about payment received after dis list is generated to avoid unnecessary trips***
11	***updating of payment by field staff by calling a designated person***
12	***The system should be able to provide updates on the customer status :***
	• ***As live or Active***
	• ***As disconnected***
	• ***As inactive***
	• ***As dismantled***
13	***Should have Linkage with New connection module to support arrears settlement:***
14	***Tracking and escalation of disconnection/dismantling failures to utility defined higher authority***
15	***Support Termination of connection both consumer initiated (Installation surrender) and company initiated (Permanent disconnection) with or without deposit adjustments, Refund of Deposits/ Misc/ Revenue***
16	***Support arrears transfer from one installation to other installation***
17	***Exception reports on payment by disconnected consumers***

6. MIS REPORTS:

Service Providers shall analyze existing reports and finalize the format and periodicity. Detailed/Summary level Reports shall be available in all hierarchies viz., Organization (Meter reader/SO to Company) ,Geography (Village to District), Local Authority (Village/Gram Panchayath , TMC, CMC, Corporation, BBMP), Electrol segement (Assembly segment, parliament segment), Infrastructure (DTC wise, Feeder wise, Station wise), Periodicity like day wise, day

range wise and month wise , Quarterly, Month rangewise, Year wise, Tariff wise/Head wise/Counter wise etc.,

List of sample reports are as follows:

1. ENERGY AUDIT REPORTS – DTC WISE/FEEDER WISE/STATION WISE/TOWN WISE
2. ENERGY AUDIT REPORT – OFFICE HIERARCHY WISE SAY SECTION/SUB-DIVISION/ DIVISION/CIRCLE/ZONE/COMPANY WISE
3. LEDGER EXTRACT
4. GROUP STATEMENT [EX: ARREARS/BILLING STATEMENTS OF STATE GOVT. CENTRAL GOVT, VP/GP, TMC, CMC, CORPORATION, ETC.,]
5. **DCB + FOLLOWING SUPPORTING REPORTS:**

1	**Rebate Report**
a	Solar
b	Orphanage/Charitable
c	Phy.Handicap
d	HV rebate
e	TOD
d	IP rebate/Capacitor rebate
	Any other rebate
2	**Government Subsidy Report**
a	IP subsidy
b	BJ subsidy
c	PL subsidy
	Any other subsidy
3	Bill Correction (current month bills) Report
4	Bill Correction (Previous months bills) Report
5	Bill Withdrawal (current month bills) Report
6	Bill Withdrawal (Previous months bills) Report
7	Credit Adjustment Report -ITEM WISE
8	Debit Adjustment Report -ITEMWISE
9	Un billed Credit Adjustment Report -ITEMWISE
10	Un billed Debit Adjustment Report-ITEMWISE
11	ECS incentive report
12	Advance payment incentive
13	Prompt payment incentive
14	Ch dishonour (current month) report
15	Ch dishonour Previous months (report)
16	Billing efficiency report
17	Consumption & Demand report
18	Collection reports
19	Payment transfer reports
20	Arrears transfer reports
21	BESCOM adjustment - Free lighting
22	BESCOM adjustment - office lighting
23	Bill round off adjustments

24	Adjustment of Deposit -MMD
25	Adjustment of Deposit -MSD
26	Adjustment of ACC
27	Adjustment -write off
28	Adjustment -refunds
29	Interest on Deposit
30	Transfer from Suspense
31	Write off
33	13 types of ratios defined by KERC

6. **CASH REPORTS**:

CASH REPORTS		
CASH COLLECTION	COLLECTIONS	DATE WISE, DATE RANGE WISE, MONTHWISE, IN-DETAIL, IN-SUMMERY COUNTER WISE,EXTERNAL AGENCY WISE, ECS, ON-LINE, E-PAYMENTS MRWISE,SECTION OFFICE WISE, SUB-DIVISION WISE, DIVISION WISE, CIRCLE WISE, ZONE WISE, BESCOM WISE. + OTHER HIERACRHY WISE ON DEMAND
	RECEIPT CANCELLATIONS	
	T0 -OTHER SUB-DVN COLLNS (OUT-GOING)	
	FROM- OTHER SUB-DVN COLLN (IN-COMING)	
	CHEQUE /DD REPORT > Rs 25000	
	CHEQUE /DD REPORT < Rs 25000	
	HEADWISE	
	TARIFFWISE	
	INTER ACCOUNT TRANSFER	
	SUSPENSE TO REVENUE	
	DEPOSIT TO REVENUE	
	REPOSTING	
	INSTNS FOR WHICH DOUBLE AMT PAID	
	INSTALLATIONS HAVING MINUS BALANCE	
	CHEQUE DISHONOUR	
	CHEQUE RETURN CHARGES	
	EXTERNAL AGENCY PAYMENT UPLOAD CONTROL CHART	

7. BILLING REPORTS:

BILLING REPORT	BILLING EFFICIENCY	DATE WISE, DATE RANGE WISE, MONTHWISE, IN-DETAIL, IN-SUMMERY TARIFFWISE, READING DAY WISE MRWISE,SECTION OFFICE WISE, SUB-DIVISION WISE, DIVISION WISE, CIRCLE WISE, ZONE WISE, BESCOM WISE. DTC WISE, FEEDER WISE, STATION WISE,
	INSTNS FOR WHICH BILLS WERE NOT GENERATED **(UN-BILLED)**	
	ABNORMAL CONSUMPTION WITH %, CON RANGE, SL/CD WISE, AMOUNT RANGE	
	SUB NORMAL CONSUMPTION WITH %, CON RANGE, SL/CD WISE, AMOUNT RANGE	
	BILL CORRECTION (CURRENT MONTH BILLS) REPORT	
	BILL CORRECTION (PREVIOUS MONTHS BILLS) REPORT	
	BILL WITHDRAWAL (CURRENT MONTH BILLS) REPORT	
	BILL WITHDRAWAL (PREVIOUS MONTHS BILLS) REPORT	

	DOOR L0CK (DL)	TOWN WISE SLAB WISE, + OTHER HIERACRHY WISE ON DEMAND
	MNR	
	VACANT/NOT IN USE	
	CONSUPTION, DEMAND	
	AGE WISE ZERO CONSUPTION	
	SLUM REPORT	

8. METER READING:

METER READING	METER READING SHEET	TARIFF WISE, DAY/READING DATE WISE DATE RANGE WISE, MONTHWISE, IN-DETAIL, IN-SUMMERY MRWISE,SECTION OFFICE WISE, SUB-DIVISION WISE, DIVISION WISE, CIRCLE WISE, ZONE WISE, BESCOM WISE. DTC WISE, FEEDER WISE, STATION WISE, TOWN WISE OTHER HIERACRHY WISE ON DEMAND
	METERS NOT RECORDING	
	METERS REPLACED	
	AGE /TYPE/ MAKE WISE METER DETAILS	
	METER SLOW	
	METER CREEPING	
	METER SEALS MISSING	
	METER LOCATION	
	METER BURNT OUT	
	MR PERFORMANCE REPORT [INPUT VS OUT PUT EX: DTC CONSN. VS BILLED CONSUMPTION ETC.,]	
	METER READER CONTROL CHART	

9. DISCONNECTION & RECONNECTION:

DISCONNECTION & RECONNECTION	PENDING DISCONNECTION LIST	TARIFF WISE, DATE/READING DATE WISE, DATE RANGE WISE, MONTHWISE, IN-DETAIL, IN-SUMMERY MRWISE,SECTION OFFICE WISE, SUB-DIVISION WISE, DIVISION WISE, CIRCLE WISE, ZONE WISE, BESCOM WISE. DTC WISE, FEEDER WISE, STATION WISE, TOWN WISE ,SLAB WISE, + OTHER HIERACRHY WISE ON DEMAND
	DETAIL DISCONNECTION LIST	
	PENDING DISMANTLING LIST	
	DETAIL DISMANTLING LIST	
	INSTALLATIONS HAVING ARREARS (AFTER DUE DATE)	
	LIST OF TERMINATION NOTICE ISSUED	
	AGREEMENT TERMINATED	
	FORM-A,	
	FORM-B	
	FORM-C	
	WRITE-OFF	
	PENDING RECONNECTION LIST	
	DETAIL RECONNECTION LIST	
	D&R FEE	
	DISCONNECTION EXEPTED CASES	
	TRANSFER OF ARREARS	
	PENDING DISCONNECTION LIST DUE TO NON PAYMENT OF ASD	
	DETAIL DISCONNECTION LIST DUE TO NON PAYMENT OF ASD	

	PENDING DISCONNECTION LIST FOR OTHER REASONS	
	DETAIL DISCONNECTION LIST FOR OTHER REASONS	
	AGEWIE ARREARS	

10. NEW CONNECTION

NEW CONNECTION	Application Pendency Report	TARIFF WISE, LOAD WISE DAY/READING DATE WISE DATE RANGE WISE, MONTHWISE, IN-DETAIL, IN-SUMMERY MRWISE,SECTION OFFICE WISE, SUB-DIVISION WISE, DIVISION WISE, CIRCLE WISE, ZONE WISE, BESCOM WISE. DTC WISE, FEEDER WISE, STATION WISE, TOWN WISE OTHER HIERACRHY WISE ON DEMAND
	6 A report	
	NEW CONNECTIONS SERVICED	
	TEMPORARY INSTNS SERVICED	
	ADDL. LOAD SERVICED	
	NO. OF LOAD REDUCTIONS	
	MERGING OF INSTALLATIONS	
	BIFURCATION OF INSTALLATION	
	NAME CHANGE	
	TARIFF CHANGE	
	REBATES SANCTIONED	
	DTCs ADDED	
	DTCs REMOVED	
	FEEDERS ADDED	
	FEEDERS REMOVED	
	STATIONS REMOVED	
	STATIONS ADDED	
	INSTALLATIONS SURRENDERED	
	INSTALLATIONS PERMANENTLY DISCONNECTED	
	INSTALLATIONS SERVICED WITH METERS – CONSUMER BORNE	
	INSTALLATIONS SERVICED WITH METERS – COMPANY BORNE	
	INSTALLATIONS SERVICED WITH OUT METERS	
	NO. INSTALLATIONS REGULARISED	
	SCHEME WISE INSTALLATIONS SERVICED	
	CAPACITY ADDITIONS	
	SANTIONED/CONNECTED LOAD	

ANNEXURE – IX

Cyber Security Guidelines:

1. The Contractor shall adhere to the regulations specified in CEA (Cyber Security in Power Sector) Regulation, 2021. The Contractor herein refers to OEM/Supplier/Vendor/Integrators, and is the Responsible Entity as defined in the regulations.

2. The bidder through a digitally signed statement by their Authorized representative shall disclose along with their bid, the existence and reasons for all known cyber security vulnerabilities or identified backdoor codes in effect till the submission of bid by the Contractor, in each of their Product offered for sale. Further known cyber security vulnerabilities or identified backdoor codes should be disclosed by the Contractor during post bid discussion if any held by the Employer. The Employer reserves the right to seek compensatory security controls for mitigation of the disclosed vulnerability or identical backdoor codes along with the letter of Acceptance of the Supply Order/Work Award Order or to reject the bid without any notice to the Contractor, based upon the risk evaluation of the disclosed cyber security vulnerabilities by the Contractor.

3. The successful bidder through a digitally signed statement by their Authorized representative shall submit along with their Letter of Acceptance of Supply Order/Work Award Order, the details of obsolescence of any part/component of hardware/software and the list of all new cyber security vulnerabilities in each Product offered for sale, discovered subsequent to the submission of bid, by the Contractor or has come to the knowledge of the Contractor or been brought to the Contractor’s knowledge, by any of their existing Customer or previous Customer, Partner or related/unrelated third Party.

4. During the currency of support agreement for the Products supplied to the Employer or till termination of the support agreement been communicated to the Authorized representative of the Contractor in writing by the Employer, the Contractor shall be liable to disclose details of all additional cyber security vulnerabilities, that been discovered by the Contractor or that comes in the knowledge of the Contractor or is brought to the Contractor’s knowledge by any of their existing Customer or previous Customer, Partner or related/unrelated third Party, along with cyber threat mitigation measures which needs to be taken thereof by the Employer, without any further commercial implication to the Employer.

5. During the currency of support agreement for the Products supplied to the Employer or till termination of the support agreement been communicated to the Authorized representative of the Contractor in writing by the Employer, the Contractor shall disclose details of all exploits of cyber security vulnerabilities, previously known or unknown, in all Products supplied to the Employer or similar Products supplied to any other customer by the Contractor, immediately upon such information coming in the knowledge of Contractor, through any source including Cyber Security Audit carried out by CERT-In empanelled Auditors, along with cyber threat mitigation measures, which need to be taken thereof by the Employer, without any further commercial implication to the Employer.

6. The Contractor during the currency of support agreement for the Products supplied to the Employer and even after the expiry of the support agreement, shall inform to the Employer from time to time, through the mutually agreed digital/physical mode, in case the Contractor comes across any event(s) or condition(s) that may probably result in, any security breach or likely risks of other compromises, within the Employer's IT or OT Systems and Data Bases, along with cyber threat mitigation measures, which needs to be taken thereof by the Employer, without any further commercial implication to the Employer.

7. In case the Contractor, intentionally or unintentionally, fails to provide, or deliberately do not provide the information or fails to provide cyber threat mitigation measures to be taken thereof by the Employer, as mandated in above clauses from Sl No 2 to Sl No 6, the Commercial Performance Guarantee of the Contractor submitted with the Employer shall stand forfeited without issuance of any show cause notice by the Employer to the Contractor. In case if the Commercial Performance Guarantee of the Contractor submitted with the Employer is forfeited, the Contractor, their Partner Contractor if any, shall be debarred from the participation in future bids invited by the Employer.

8. The Contractor through a digitally signed statement by their Authorized representative shall certify that the cyber security features designed, recommended in the Product supplied by the Contractor or their Authorised Partner or Subsidiaries to the Employer, are in accordance with the defined IEC/ISO/IS Standards, best practices, Cyber laws, and Regulations, as specified by the Employer in their bid document and essential for safe and secure Operation and Maintenance of the IT/OT/ICS systems of the Employer.

9. The Contractor shall ensure that Product supplied against the Supply Order/Work Award Order under consideration, as well as the modifications, reconfiguration, upgradation, changes in Parameters, settings proposed to be made to the existing Architectural layout or utilization of Cyber Assets, as part of the execution of Supply Order/Work Award Order, are in accordance with the defined IEC/ISO/IS Standards, best practices, Cyber laws, and Regulations, as specified by the Employer in their bid document and essential for safe and secure Operation and Maintenance of the IT/OT/ICS systems of the Employer. All modifications shall be carried out by the Contractor as per mutually written agreement between Employer and Authorized representative of the Contractor, before its implementation/commencement of Supply Order/Work Award Order. The Employer shall be responsible for consulting cyber security experts and for arranging the necessary support to the Contractor, if any modifications are to be made to the existing Architectural layout or utilization of Cyber Assets.

10. The Contractor shall provide a host-based malware detection scheme for the control system network and equipments as per the IEC/ISO/IS Standards mentioned in the bid document of the Employer. The Contractor shall certify the adequacy of the system performance of the deployed host-based malware detection scheme for quarantine (instead of automatically deleting) suspected infected files and the Contractor shall also provide the scheme for updating the Malware signatures. The Contractor shall also test

major updates to malware detection applications and provide performance measurement data on the impact of using the malware detection applications in an active system.

11. The Contractor through a digitally signed document by their Authorized representative shall submit to the Employer, in detail the tried and tested backup and disaster recovery technology and plan for the Product as practised by the Contractor till the time of submission of bid.

12. In case, the Contractor accepts the Supply Order/Work Award Order, then, on demand made by Employer, the Contractor shall provide documentation detailing all applications, utilities, system services, scripts, configuration files, databases, and all other software required and the appropriate configurations, including revisions and/or patch levels for each of the computing & Storage systems to the extent deemed necessary for safe and secure operation and maintenance of IT and OT System.

13. The Contractor shall advise Employer as per mutually agreed Terms and Conditions on the measures to be followed by the Employer during Operation and Maintenance of the IT and OT System in accordance with applicable IEC/ISO/IS Standards and best practices, which shall include but are not limited to, cyber security policies and procedures, documentation and training requirements, continuous monitoring of assets for tampering and intrusion, periodic evaluation for asset vulnerabilities, implementation and update of appropriate technical, physical, and operational standards, and offline testing of all software/firmware patches/updates prior to placing updates into IT and OT Systems of the Product.

14. The Contractor shall provide a listing of services required for all ICT based sub-systems and applications of the Product supplied by them to the Employer. The listing shall include all ports and services required for normal operation as well as any other ports and services required for emergency operation/maintenance of the Product. The listing shall also include an explanation or cross reference furnished by the Contractor or by any authorised Person on behalf of Contractor, to explain why each service is deemed necessary for operation and maintenance of the supplied Product.

15. The Contractor shall certify and provide proof that all default passwords have been reset with hardened password and services are patched to current released version till the time of completion of SAT procedure and issue of successful SAT completion certificate by the Employer.

16. The Contractor shall remove a software component if not required for the operation and maintenance of the system or application, with the Employer’s due written permission only. The Contractor shall maintain documentation on what has been removed and shall furnish this information to the Employer as and when called for by the Employer.

17. The Contractor shall notify the Employer in writing on the non-standard operation carried out by the Employer’s Employees and that the Contractor shall not be held liable for Vulnerabilities exposed by the listed incorrect operation carried out by the Employer’s Employees or any person other than those working on behalf of the Contractor. However,

the Contractor shall stand for prosecution and bear any consequential loss or damage suffered by the Employer from exposure to such Vulnerabilities which were known to the Contractor and intentionally not disclosed to the Employer or no measures were suggested for mitigation of risk from such known vulnerabilities.

18. The Contractor shall conduct a mandatory cyber security audit of the entire system delivered twice in a year in accordance with the latest guidelines issued by Ministry of Power, Government of India.
19. Should any Employee of Contractor if required or to be permitted the Logical Access or unescorted physical access to the Cyber Assets of the Employer or of any of their Affiliates, that are identified as "Critical Infrastructure" or as "Protected System" by NCIIPC {constituted under IT Act 70A}, then the Employee of the Contractor shall meet pre-requisites mandated by Employer prior to gaining access to any such "Critical Infrastructure" or "Protected System" of the Employer.
    (i) Therefore, when any secured electronic or physical access is needed or to be permitted, all Employees of the Contractor identified as above in this provision shall:
        (a) abide by and shall have successfully completed the Contractor-administered background screening requirement.
        (b) have undergone successfully the mandatory Cyber Security training prescribed by the Employer, for all of their "Critical Infrastructure" and "Protected System" as per CEA(Cyber Security in Power Sector) Regulations 2021.
        (c) have a valid Contractor Identification document and should have been listed in Contractor's Management System for tracking purposes;

        Pursuant to this clause in order to ascertain fitness, qualification and integrity of Employees identified for executing Works awarded to the Contractor, the Contractor shall perform background investigation on these Employees of their Contractor or of their Supplier or of Subcontractors assigned to execute such Work on behalf of the Contractor at the Employer's site or at facilities of the Contractor, their Suppliers/Sub Contractors.

        (d) in the event that the Contractor or their Supplier or Sub-Contractor
            (i) determines that any of the Employee permitted access pursuant to this clause no longer requires access or
            (ii) terminates the employment of any of the Employee having valid permission to such an access.

        pursuant to this clause, Contractor shall notify Employer in writing within 24 hours of such determination or termination.
    (ii) The Contractor shall be held responsible and shall have to bear the cost of the damages resulting to the Employer's Asset, Facilities, Business interruptions or damage to the Employer's reputation, out of any cyber incident resulting of any misconduct, on site or remotely, directly or indirectly by the Employee(s) of the Contractor or the Employee(s) of the Supplier or Subcontractor.

20. The Contractor shall password protect the BIOS from unauthorized changes unless it is not technically feasible, in which case Contractor shall document this case and provide

mitigation measures. The Contractor shall handover all the BIOS passwords and provide a documented list of all disabled or removed USB ports, CD/DVD drives, and other removable media devices.

21. With the due approval of the Employer, the Contractor shall configure the network devices to limit access to/from specific locations, where appropriate, and provide documentation of the configuration. With the due approval of the Employer, the Contractor shall configure the system to allow the system administrators the ability to re-enable devices if the devices are disabled by software and provide documentation of the configuration.

22. The Contractor shall have and provide to the Employer the documentation of a written flaw remediation process. Contractor shall provide appropriate software updates and/or workarounds to mitigate all vulnerabilities associated with the flaw in the Product within and up to a pre-negotiated period. After Contractor is made aware of or discovers any flaws, Contractor shall provide notification of such flaws affecting security of software supplied by the Contractor, within and up to a pre-negotiated period. Notification shall include, but is not limited to, detailed documentation describing the flaw with security impact, root cause, corrective actions, commercial implication if any, etc.

23. In addition to the foregoing, the Contractor shall immediately notify Employer in writing if the Contractor at any time discovers any part of the Work to be defective or not in accordance with the Work Award Order.

24. The Contractor shall comply with the Employer’s Application Security standards as mentioned in the bid document, whenever Employer seeks Coding for Security enhancement.

25. The Contractor shall provide a process for Employer’s Employee(s) to submit problem reports and remediation requests to be included in the system security. The process shall include tracking history and corrective action status reporting. The Contractor shall review and report their initial action plan within 24 hours. Contractor shall secure reports on problem regarding security vulnerabilities from public discloser and notify Employer of all problems and remediation steps, regardless of origin of discovery of the problem. Contractor shall inform Employer in writing of flaws within applications and operating systems in a reasonable period and provide corrective actions, fixes, or monitoring guidance for vulnerability exploits associated with the flaw. Contractor shall provide an auditable history of flaws including the remediation steps taken for each.

26. The Contractor shall provide a system whereby account activity is logged and is auditable both from a management (policy) and operational (account use activity) perspective. Contractor shall time stamp, encrypt, and control access to audit trails and log files. The Contractor shall ensure audit logging does not adversely impact system performance requirements. Contractor shall provide read-only media for log creation.

27. The Contractor shall provide a configurable account password management system that allows for selection of password length, frequency of change, setting of required password complexity, number of login attempts, inactive session logout, screen lock by application, and denial of repeated or recycled use of the same password. Contractor shall not store passwords electronically or in Contractor supplied hardcopy documentation in clear text unless the media is physically protected. Contractor shall control configuration interface access to the account management system. Contractor shall provide a mechanism for rollback of security authentication policies during emergency system recovery or other abnormal operations, where system availability would be negatively impacted by normal security procedures, but such rollback shall not be automatic, and would require the specific affirmative agreement of Employer.

28. The Contractor shall configure hosts Operator workstation with least privilege file and account access and provide documentation of the configuration. The Contractor shall configure the necessary system services to be executed at the least user privilege level, possible for that service and provide documentation of the configuration. Upon the completion of the task of changing or disabling access to such files and functions as directed by the Employer, the Contractor shall provide documented evidence that the tasks has been successfully completed.

29. The Contractor shall recommend which specific accounts need to be active and those that can be disabled, removed, or modified. The Contractor shall disable, remove, or modify all the accounts pursuant to the approved recommendation from Employer. The Employer shall be responsible for correct usage and maintenance of the defined accounts.
30. Limitation of Liability

    (i) In General, the Contractor is responsible and liable, till the Contract period, for mitigating all vulnerabilities associated with the Product and maintaining the established level of system security in the system of the Employer.
    (ii) In particular Contractor assumes no liability whatsoever for damage caused by

        (a) unauthorized modification of the system configuration or security level;
        (b) the installation of patches which are not authorized by Contractor; or
        (c) the Employer delaying the self-installation of patches made available by Contractor.

31. Definitions for various terminology shall be in accordance with international standard e.g. ISO/IEC series 27000, 27001, IS 16335, IEC 62443
32. Prior reference countries means a country which shares the land border with India.

    Any item imported for end use or to be used as a component or as a part in manufacturing, assembling of any equipment or to be used in power supply system or any activity directly or indirectly related to power supply system shall adhere to the following guidelines:

    (i) All the equipment, components, and parts imported for use in the Power Supply System and Network shall be tested in the country to check for any kind of embedded malware/Trojans/cyber threat and for adherence to Indian Standards

(ii) All such testings shall be done in certified laboratories that are designated by Ministry of Power (MOP), Government of India.

(iii) Any import of equipment/component/parts from “prior reference” countries as specified or by persons owned by, controlled by, or subject to the jurisdiction or the directions of these “prior reference” countries will require prior permission of the Government of India

(iv) Where the equipment/component/parts are imported from “prior reference” countries, with special permission, the protocol for testing in certified and designated laboratories shall be approved by the Ministry of Power (MOP), Government of India.

33. IT HARDWARE:

(i) All IT hardware equipment supplied shall have a valid Certificate of Common Criteria as per ISO/IEC 15408 issued by signatories of the Common Criteria Recognition Agreement (CCRA) – www.commoncriteriaportal.org.

(ii) Import/Procurement and supply from vendors sourcing from prior reference countries, the certificate for Common Criteria shall be from Government Laboratories in India according to the IC3S scheme operated by Ministry of Electronics and Information Technology, which is a signatory to CCRA. https://www.commoncriteria-india.gov.in/

Annexure-X

IMPORTANT : TO BE UPLOADED IN The Karnataka Public Procurement Portal

PROFORMA OF SELF DECLARATION ON BIDDER's PERFORMANCE
(To be furnished on the Bidder's Letter Head)

Ref ……. Date …….

To,
The General Manager (Customer Relations)
Corporate Office, BESCOM,
K R Circle,
Bengaluru – 560 001, Karnataka, India

Dear Sirs,

I*/We* have read and examined the requirement of the tender condition stipulated against clause No. ….. of Section IFB of Bid Documents relating to the Tender Enquiry No. ……. for …….. (full scope of Work).

I*/We* hereby undertake to declare that

i) I*/We* have not made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or

ii) I*/We* have not any record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc.; and/or

iii) I*/We* have participated in the previous Tender for the same nature of work and had not quoted unreasonably high tender prices and furnished prices were rationally justified.

This undertaking is in consideration of BESCOM agreeing to open my/our Bid and consider and evaluate the same for the purpose of award of work in terms of provisions of clause entitled "Award of Contract" Section ITB, conditions of contract in the bid documents.

Date: Signature along with Seal of Co.

……
(Duly authorised to sign the Tender On behalf of the Bidder)
Name .....
Designation .....
Name of Co ..... (in Block Letters)

*Strike out whichever is not applicable.

Annexure- XI

Declaration on not being blacklisted
(To be submitted on the Non-judicial stamp paper of appropriate value)

To,
The General Manager (Customer Relations)
Corporate Office, BESCOM,
K R Circle,
Bengaluru – 560 001, Karnataka, India

Date: __/__/2023

Dear Sir,

Subject: "**Implementation of Smart Business Management System by providing Web Based Total Revenue Management (TRM) Modules, GIS, BI & Analytical tools and other modules along with supply of Hardware, Software, Man Power, Stationaries and Consumables on the basis of System as a Service (SaaS) and other allied services in Sub-Divisions and Accounting Sections of Non-RAPDRP areas in Chitradurga Area Zone (CTAZ) and Bangalore Rural Area Zone (BRAZ)**"

Reference: Tender Enquiry No. :

Dear Sir,

We hereby declare that M/s_____ with any of the State government or Central Government or PSU or Municipal agencies in India or Abroad at the time of submission, (i) is not under a declaration of ineligibility for corrupt or fraudulent practices with any of the State government or Central Government or PSU or Municipal agencies in India or Abroad at the time of submission. AND (ii) Have not been blacklisted or banned or debarred. AND (iii) Our Work orders have not been short closed due to non-performance or LOA is withdrawn by the owner due to inefficiency in performing or implementing assigned project in technically/financially.

Further we undertake that, If BESCOM found that the above undertaking consists of misleading information and/or suppressing of the facts, BESCOM shall reject the bid and BESCOM reserves the right for black listing including initiation of legal/criminal proceeding

Signature
Name in Block Letters

Designation
Firm Name Date

Annexure-XII

IMPORTANT : TO BE UPLOADED IN The Karnataka Public Procurement Portal

PROFORMA OF SELF DECLARATION FOR BORDER SHARING OR NOT SHARING BY BIDDERS

(To be furnished on the Bidder's Letter Head)

Ref ..... Date .....

To,
The General Manager (Customer Relations)
Corporate Office, BESCOM,
K R Circle,
Bengaluru – 560 001, Karnataka, India

Dear Sirs,

I*/We* have read and examined the requirement of the tender condition stipulated against clause No. ..... of Section ..... of Bid Documents relating to the Tender Enquiry No. ..... for ..... (full scope of Work)

I*/We* hereby undertake to declare that **(Applicable in case of Bidders from Countries not sharing Border with India)**

I*/We* have read the clause regarding restrictions on procurement from a Bidder of a country which shares a land border with India;
I*/We* certify that .....(Bidder) is not from such a countrywhich shares a land border with India. I hereby certify that our bid fulfills all requirements in this regard and is eligible to be considered.

OR

I*/We* hereby undertake to declare that **(Applicable in case of Bidders from Countries sharing Border with India)**

I*/We* have read the clause regarding restrictions on procurement from a Bidder of a country which shares a land border with India;
I*/We* certify that .....(Bidder) is from such a country which shares a land border with India and has been registered with the Competent Authority. I hereby certify that our bid fulfills all requirements in this regard and is eligible to be considered and also evidence of valid registration issued by the Competent Authority is uploaded.

This undertaking is in consideration of BESCOM agreeing to open my/our Bid and consider and evaluate the same for the purpose of award of work in terms of provisions of clause entitled "Award of Contract" Section ITB, conditions of contract in the bid documents.

Date: Signature along with Seal of Co.

.....
(Duly authorised to sign the Tender On behalf of the Bidder)
Name .....
Designation .....
Name of Co ..... (in Block Letters)

***Strike out whichever is not applicable.**
Please Note : Among the above two declarations, only one which is applicable is to be declared.

Annexure-XIII

No deviation Certificate

DECLARATION BY THE BIDDER

With reference to the bid Enquiry No. **BESCOM/2023-24/OW/WORK_INDENT149 dated 05.03.2024** for the "**Implementation of Smart Business Management System by providing Web Based Total Revenue Management (TRM) Modules, GIS, BI & Analytical tools and other modules along with supply of Hardware, Software, Man Power, Stationaries and Consumables on the basis of System as a Service (SaaS) and other allied services in Sub-Divisions and Accounting Sections of Non-RAPDRP areas in Chitradurga Area Zone (CTAZ) and Bangalore Rural Area Zone (BRAZ)**", we confirm that we have read the bid conditions and stipulations and all the clauses are acceptable to us and we have not taken any deviations whatsoever.

Any deviations mentioned anywhere in the document shall be ignored.

Name & Designation:		
Address of the Bidder with Seal		
Place:		
Date:		